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All Maintenance, All Vehicle Classes, All Management, All the Time

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With the right maintenance strategy emphasizing fuel efficiency, a fleet can have it all: better fuel economy, more uptime, and lower maintenance costs.

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The **BEST** Light and Medium truck (LMT) software coverage in the market was updated to make it even better. We've added new coverage for late model commercial vehicles including model years 2020 and 2021. This includes new coverage for GM truck, Ford truck including the Transit, Isuzu, Workhorse, and the Navistar CV truck. What makes this even better is the product will be improved yet again in January of 2022 with the addition of Dodge/RAM coverage. This new RAM coverage will include 2018 through 2021 coverage and will support the new Fiat/Stellantis (FCA) Secure Gateway. All this is included in the

eTechnician™

updated LMT software as well as the existing tremendous support provided within eTechnician™.

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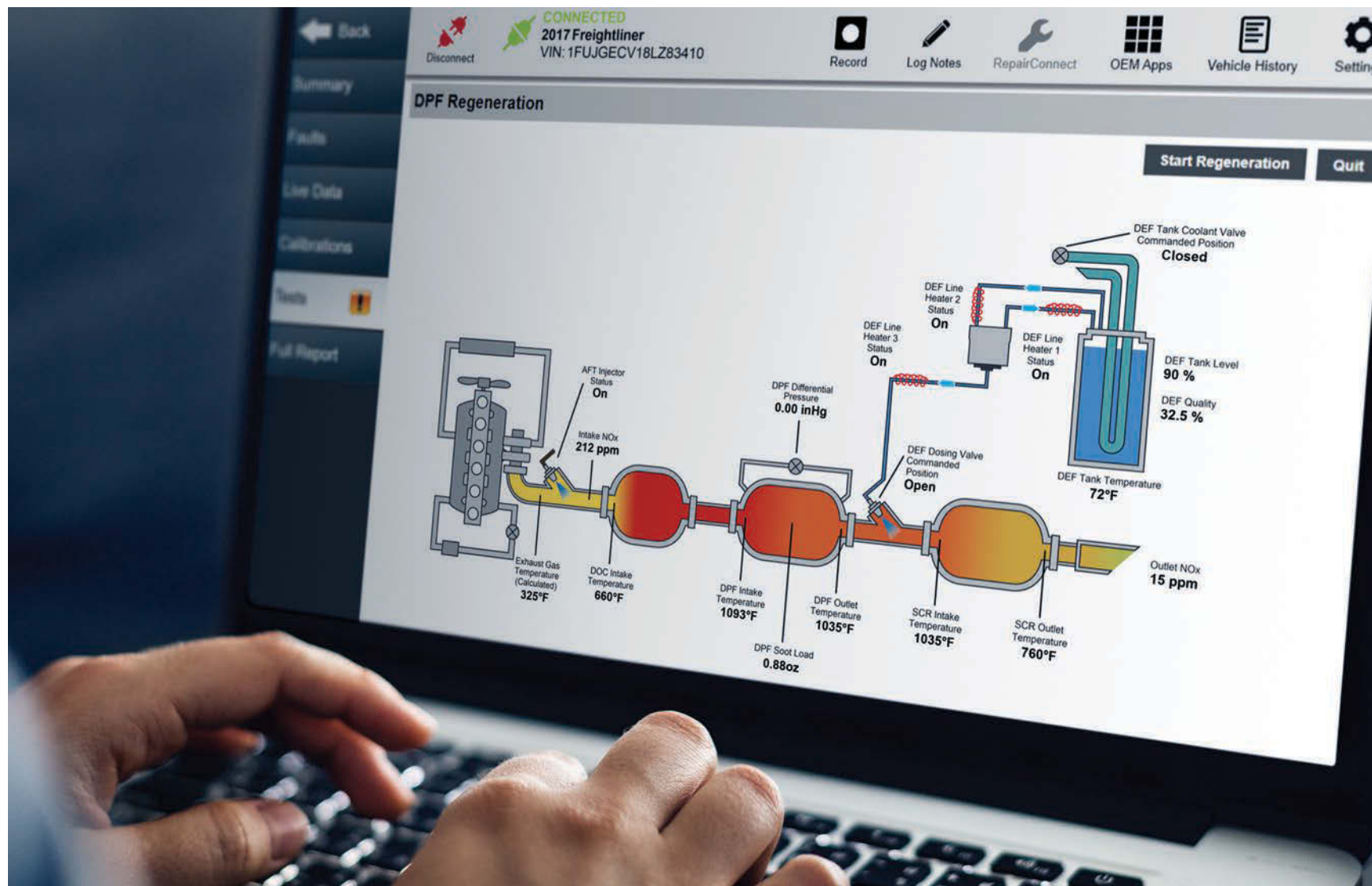
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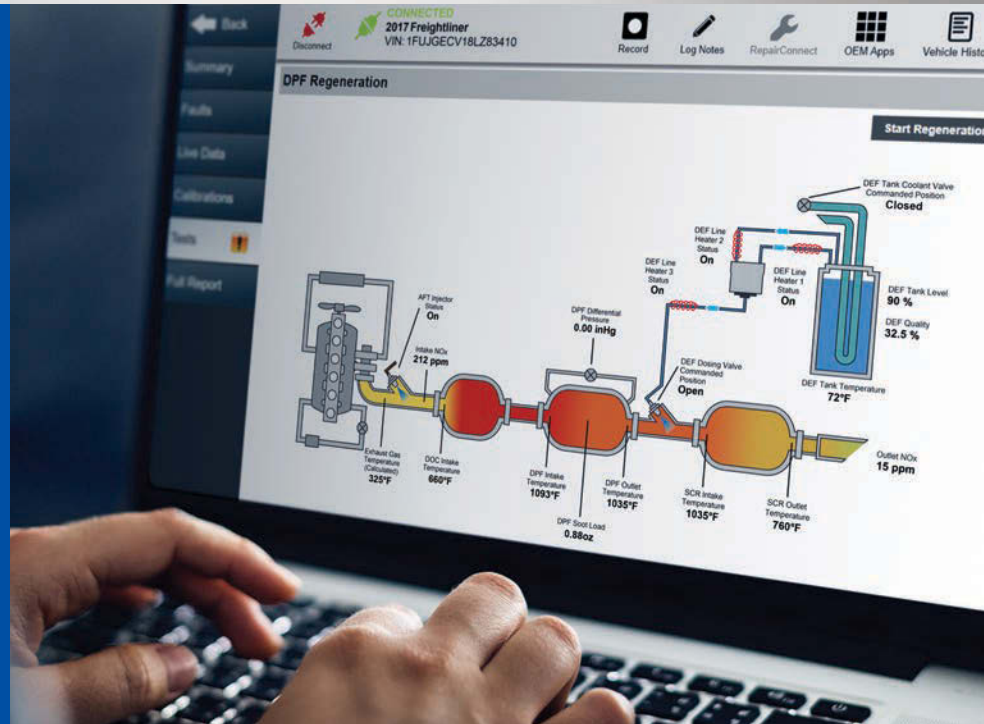
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This will enable you to try the product for 14 days and see the difference.



COMING SOON: LMT 2021

Coverage Expanded
Through 2021 For GM®,
Ford®, ISUZU®, and
NAVISTAR® CV Truck



WHAT'S NEW WITH THIS RELEASE

GM

- Chevrolet Express/GMC Savana (2500 - 4500)
Model Yrs 2020-2021
 - Engines:
 - LC8 (2020)
 - L96 (2020)
 - LV1 4.3L (2020-2021)
 - LWN 2.8L Duramax (2020-2021)
 - L8T 6.6L Gas (2021)
 - Brakes
 - Transmissions
 - Chassis Control Module
 - Body Control Modules
 - Inflatable Restraint Sensing Diagnostic Module
 - Instrument Cluster
- Chevrolet Silverado/GM Sierra (1500 - 3500 and 2500 - 6500)
Model Yrs 2020-2021
 - Engines:
 - L3B 2.7L Turbo
 - L82 5.3L
 - L84 5.3L
 - L87 6.2L
 - LV3 4.3L
 - LM2 3.0L Duramax
 - L5P 6.6L Duramax
 - L8T 6.6L
 - Brakes
 - Transmissions
 - Chassis Control Module
 - Body Control Modules
 - Inflatable Restraint Sensing Diagnostic Module
 - Instrument Cluster

Ford

- F-Series 150
 - 2.7L
 - 3.3L Ti-VCT
 - 3.5L GTDI
 - 3.0L PowerStroke
 - 5.0L
- Super Duty F-250/350/450/550
 - 6.2L V8
 - 7.3L V8
 - 6.7L V8 PowerStroke
- S-Super Duty Gas 650-750
 - 7.3L
 - 6.7L PowerStroke
- Transit
 - 3.5L Cyclone
 - 3.5L EcoBoost
 - 2.0L EcoBlue
- Transit Connect
 - 2.0L GDI I4
 - 2.5L iVCT

ISUZU

- Updated to the Latest Coverage (2020 - 2021)
- Low Cab Forward (ISUZU) 3500 - 6500XD
 - Engines:
 - L96 6.0L GAS (2020)
 - LC8 6.0L Gas (2020)
 - L8T 6.6L Gas (2021)
 - I1B 5.2L Diesel (2020 - 2021)
 - Brakes
 - Transmissions
 - Mimamori Unit support

NAVISTAR CV Truck

- Updated to the Latest Coverage (2020 - 2021)
 - Engine: Chevrolet Silverado 6.6L Duramax
 - Brakes: TRW eBoost Global A
 - Transmission - Allison
 - Inflatable Restraint Sensing and Diagnostic Module
 - BCM
 - Chassis
 - IPC



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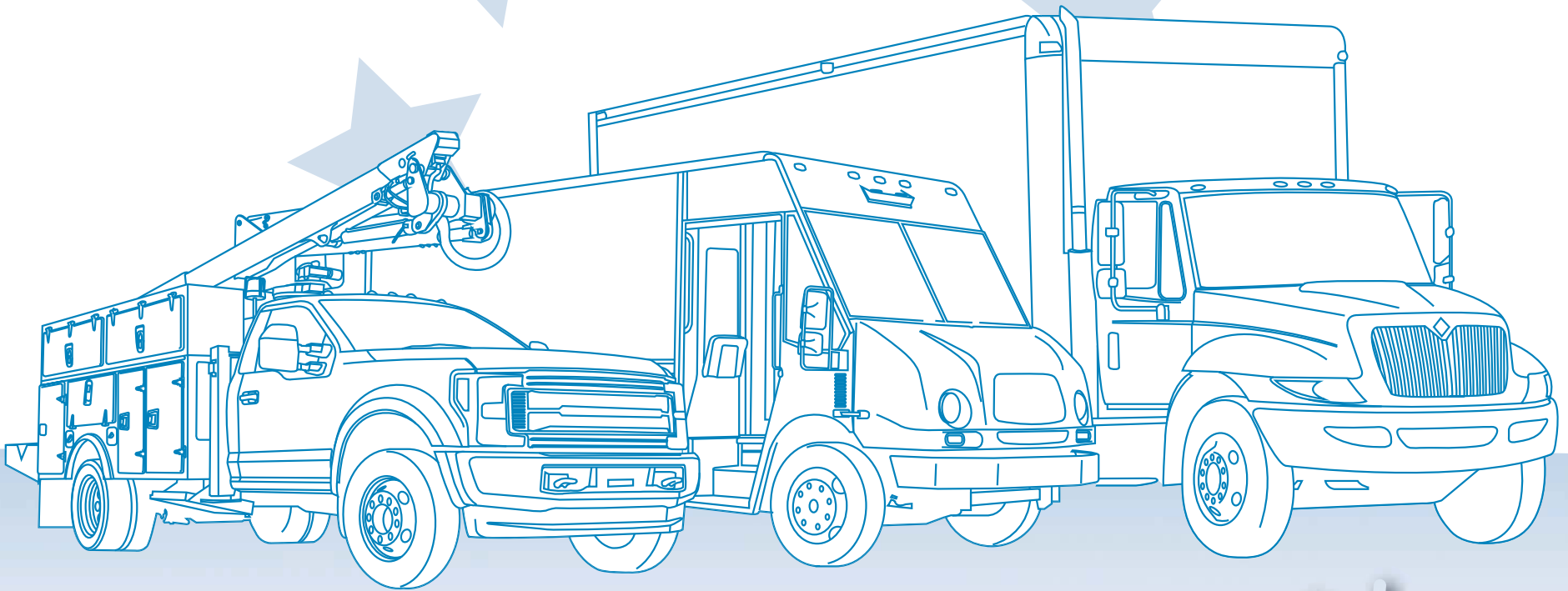
A roundup of the latest tool and equipment offerings.

57 Classifieds

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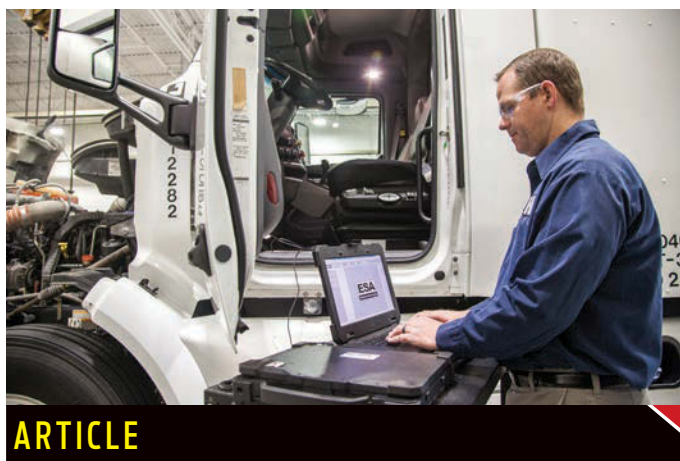
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ARTICLE

Winning the maintenance data battle

The war for ultimate efficiency and uptime is won by shops that know how to leverage their data.

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VIDEO

Stertil-Koni TechTalk— Lift Safely

Seven steps technicians should follow when operating heavy-duty vehicle lifts.

FleetMaintenance.com/21231188



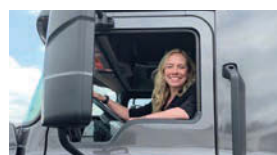
ARTICLE

Penske augments trainers with HoloLens to mold more skilled technicians

The company's maintenance trainers wear HoloLens 2 headsets to access augmented reality and teach entry-level techs brake and wheel inspections.

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ARTICLE



A fond farewell

A note from departing Endeavor Commercial Vehicle Group's editorial director, Erica Schueller.

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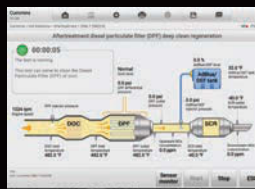


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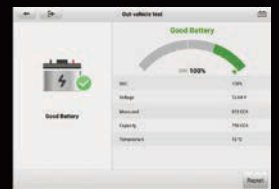


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Parts procurement is such sweet sorrow

When eBay is your final destination for finding the part you need, it's a sign the current situation playing out is a tragedy.



By John Hitch
Editor



@Hitched2Trucks



Greetings, Fleet Maintenance readers! It's an honor to be running things here at *Fleet Maintenance*, and I want you to know as the new editor it will be my mission (and pleasure) to provide your teams with the knowledge, parts news, and best practices to keep your shops running and trucks humming. We'll try to do this in fresh and inventive ways that appeal to every level of maintenance management, and we'll help educate your technicians on the basics as well as the complex issues.

Sometimes even the basics can be quite complex. This was the case for Quality Transport, a fleet of under 20 trucks that ran across tough times in the rugged Arizona northland. As the company's senior vice president, Amanda Schuier, tells it, one of their Freightliner Cascadias went down in Flagstaff due to a busted Cummins water pump.

The estimated time to receive a new pump: three weeks. The safety and maintenance coordinator, Hector Pena, said he looked everywhere he could, from dealer portals to Amazon.

"Things are getting worse for parts," Pena wrote to me in an email. "Availability is limited, and some of the places that have the parts are charging a premium price."

To get the truck out of Flagstaff, Pena had to settle on a marked-up pump on eBay of all places.

It's a growing problem. Waiting on fuel tanks and other issues that force downtime are rampant at Quality Transport.

"We've been warned for a while we're going to have parts issues," Schuier told me. "It's starting to impact us *hard*, especially as a small fleet with older trucks."

The dealer assured Schuier these trucks were marked "truck down, driver waiting" to indicate the severity and need for a prompt resolution, but for a small fleet with a skeleton crew of a maintenance team, there's only so much they can do. Pena has two younger maintenance technicians working with him; most of the maintenance is outsourced.

Schuier noted as a smaller fleet, they don't have as strong of a parts network as large carriers to leverage favors. The only recourse the fleet has is renting trucks, an unsustainable strategy due to added expense, scarcity of supply, and the detrimental impact on drivers.



John Hitch | Fleet Maintenance

One driver forced into a rental had trouble connecting his CPAP machine to the inverter, which is frustrating on two levels: the driver's sleep apnea hurts his chances for getting enough REM cycles to recharge, while the potential for fatigue presents a safety issue. Frustration can build into contemplating a fleet with more reliable uptime, and that is something Quality Transport, or any fleet big or small, can't afford right now.

"We're definitely hurting from the driver shortage," Schuier said. "And these truck-down situations that further delay us are just exacerbating the issue."

The good news for this fleet—and the likely hundreds to thousands of other maintenance shops facing the same dilemma—is that there is help if you know where to look.

The first place is one of the myriad of e-commerce sites out there. Since 2020, nearly every supplier has been launching them.

At the end of July, Cummins launched a new dealer portal to provide those facilities sales, with service, parts, training, and marketing resources, while offering "personalized views, while displaying a specific range of products and services relevant to each dealer based on their individual profile, market segment, and region."

That was about when the water pump issue happened, so not in time to help Quality Transport then, but maybe for a future issue.

And parts e-commerce sites are becoming far more user friendly, in the vein of Amazon or eBay. Kim Wolf, Meritor's manager of innovation and technology, recalled her Meritor

Parts Xpress group setting up a user ID for a 92-year-old man still plugging away at a distributor. The site offers images, technical details, and quantities to help users find what they need fast, and it locates who near a specific ZIP code has the part.

Meritor also has an Uptime Services Group to triage supply issues with an experienced parts expert. And that's the real thing to know: Parts problems require human solutions. And that might end with a direct call to the manufacturer, but it should start by building a better relationship with your dealers and suppliers.

"From a best practice standpoint, it's obviously about having that open line of communication with whoever your distributor partner is," Wolf said. "Sharing the information of what they have in their fleet—the makes, the models, the years—letting that distributor partner know what's sitting in their lot in need of repair in the future, that's going to be the key for fleets to even know that their distributor partner can have it on the shelf."

And how to foster those relationships requires a human touch, something sorely lacking in the industry, and society in general, since early 2020. An easy suggestion is taking your parts distributor out to lunch, getting to know them on a personal level, what their business challenges are, and how you can work better together. It's the kind of thing that 92-year-old probably did quite a bit in his career, and as technology improves, it's something we should make sure not to lose. ■

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AMT service shifts forward

Mastering the service requirements of AMTs can help fleets obtain the efficiency benefits the system offers.

By Tyler Fussner

[POWERTRAIN]



DTNA

Automated manual transmissions, or AMTs, have been successfully adopted into the heavy-duty commercial vehicle space for numerous reasons, but if you want to keep it as simple as using one, it would be for the sake of consistency.

“The top 5 to 10% of manual drivers versus AMT might not improve drastically with an AMT, but the bottom 90-95% certainly will,” said Johan Agebrand, director of product marketing, Volvo Trucks North America.

As of 2020, AMTs were spec’d in at least 90% of Class 8 flagship trucks from OEMs including Freightliner, International, Mack Trucks, Peterbilt, Volvo Trucks. Kenworth’s T680 AMT adoption reached 86% this year, growing from 30% in 2013.

With the widespread adoption of this equipment in the industry today, most, if not all, technicians have dealt with AMTs; proficiencies have been unveiled in vehicle performance as well as service intervals and maintenance practices. Understanding the best practices in servicing, including how to leverage diagnostics and an adherence to lubrication intervals, will ensure a fleet gets the most out of their AMTs.

Why AMTs?

“The biggest difference between AMTs and manuals is that with AMTs, more features and functions can be provided by the truck OEM in areas such as response, performance, and fuel efficiency,” Agebrand said.

And many drivers, especially longtime ones whose bodies felt each and every gear change, have been relieved.

“The driver shortage was certainly a primary factor; fleets needed trucks that were easier to drive,” said Mark Saholsky, director of product management at Eaton Cummins Automated Transmissions, of AMTs’ acceptance into the market.

“AMTs can replicate the shifting of the most efficient driver, allowing fleets to save fuel right away with a less experienced driver,” said Jason

Johnson, director of vehicle integration, Paccar Technical Center. “This also reduces wear and tear on the vehicle because shifting is done smoothly and consistently.”

For better driver satisfaction and efficiency, OEMs have added features such as hill start aid, engine overspeed protection, and predictive shifting, Saholsky explained.

Along with easing a driver’s job, the rise of AMTs allowed for a more perfect union between the engine and transmission. “The need for the engine and transmission to work better and smarter together—powertrain integration—was also key,” Saholsky continued. “This enabled improved fuel economy and better safety features for drivers and those around the truck.”

One such benefit was engine downspeeding, or the speeding up of the rear gear ratio to lower the engine speed. This alone could create a 3% reduction in a truck’s fuel cost, according to the North American Council for Freight Efficiency.

With the overwhelming benefits, AMTs took over. “Once truck manufacturers were able to show how AMTs improved the truck and driving experience, fleets just needed to do their payback analysis in order to justify the increased price of the truck,” Saholsky said.

Of course, AMTs continue to further develop. “AMTs are mature products, so improvements in performance and comfort are mainly handled through software algorithms and electrical diagnostic features,” Agebrand said. “When it comes to developments on AMTs, there is still a demand for faster shifts that cannot physically be done by a driver. Today, we are almost at a speed where AMTs actually perform ‘close enough’ to an automated transmission level with power delivery that there are very few applications left where an automated transmission, from a technical perspective, is needed.”

And the improvements are ramping up.

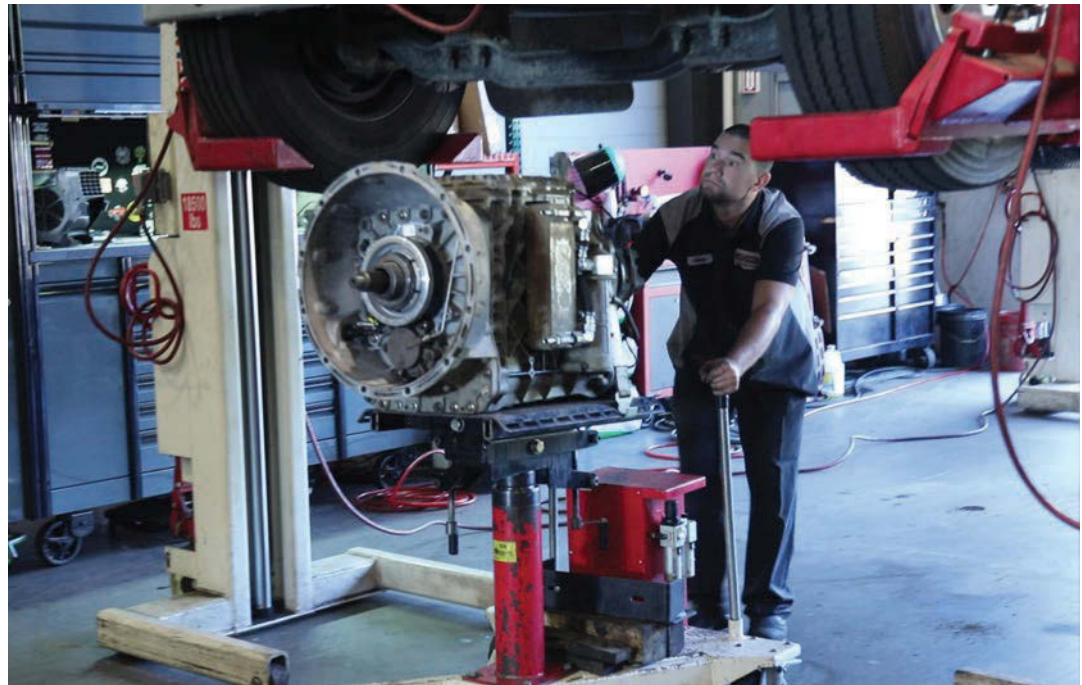
“We’re really excited about the upcoming Endurant XD series,” Saholsky said. “They are purpose-built, high-performance 18-speed automated transmissions that combine the efficiency, light weight, and low total-cost-of-ownership DNA of the Endurant platform and the reliability and toughness of the 13- and 18- speed manual transmissions that are popular in trucks of all types and a wide variety of applications. They have high-capacity bottom 8-bolt and rear PTO openings standard.”

These design changes are set to further improve fuel economy, performance, and extend service intervals, adding to a better TCO, Saholsky added.

Best practices for service

Though AMTs offer numerous advantages for a fleet’s operation, those advantages are not fully realized without attentive and adequate maintenance. It starts with technician training.

“I think the biggest thing is making sure they are educated on the product,” said Jason Lucero, service director for the Western region at TranSource, which maintains Mack, Volvo, Hino, and Isuzu trucks. “I think there were some people that were late to get into the game on the training for [AMTs], because people didn’t expect



» TranSource uses full truck lifts in their facilities to assist in AMT services and inspection.

TranSource

“As far as the maintenance side of it, we’ve actually seen a huge decrease in failure.”

Jason Lucero, TranSource

them to take off. Whereas the majority of our trucks that we sell now have automated manual transmissions. But the biggest thing, above and beyond anything, is the understanding of the product itself; and the training certainly is the most important.”

Lucero explained that TranSource leverages OEM web-based training for initial certifications for their technicians, followed by instructor-led training for component-specific certifications. TranSource also has a certified technical trainer within the organization that teaches courses on-site at their training facility where technicians attend two- to three-day classes featuring hands-on training.

“When it comes to best practices and servicing, you should follow the truck OEM’s maintenance intervals and instructions, as well as using the correct tools and original parts,” Agebrand recommended.

The smooth operation of an AMT on the road lends to their extended service intervals.

“The maintenance intervals are a lot more efficient now with this equipment,” Lucero pointed out. “For the Mack and Volvo side of things, there are 500,000 miles between service intervals. Right off the bat, you’re at half a million miles before you even service one of these, which is incredible when it comes down to cost of ownership.”

The extended service intervals can, in part, be attributed to the automated aspects of the system.

“As far as the maintenance side of it, we’ve actually seen a huge decrease in failure,” Lucero said. “Now, that’s a little bit convoluted, because there were some bugs to work out in the first couple years.” After that initial learning curve, he said AMTs typically run longer before failure than manuals.

“You’re taking the human error out of it,” Lucero continued. “These trucks have changed so much with downspeeding technology. And the transmission plays such an integral role in that.”

And downspeeding benefits overall fleet TCO by allowing the engine to burn fuel more efficiently at lower RPMs, Lucero explained.

Staying ahead of system issues through preventive maintenance is always a best practice, and AMTs are no exception, though vehicle software lends its hand in accurately understanding the system’s health.

“Preventive maintenance is very similar [in comparison to manual transmissions] in that you need to inspect things like the clutch,” Agebrand stated. “However, the way you do this is very different between AMTs and manual transmissions. On manual transmissions, you have to actually de-couple the transmission from the engine and visually inspect. For AMTs, the vehicle and software do this and can alert the service technician through the OEM service tool on the status of the clutch.”

Should PMs be missed, or proper vehicle operation is not upheld, expect clutch issues.

“One of the main issues fleets can expect from not properly maintaining or operating the vehicle is that the clutch will break through by wearing down.” Agebrand continued, stating this is intentional in the system’s design. “Otherwise, the actual gearing shafts and gears inside the transmission will break. This is the same for both AMTs and manuals.”

If the truck is in the bay, it is always useful to conduct a visual inspection.

“We’re looking for things like leaks,” Lucero said of TranSource’s inspection routine. “We’re looking at U-joints and drive lines for any kind of wear and

tear that is going to add additional stress to that transmission. We're going to look at the output shaft and make sure that we don't see any seepage there—that we don't have unnecessary movement and play up and down.”

He also said they inspect airlines to ensure good routing and that no kinking is present, nor that there is any presence of moisture.

“These automated transmissions are constantly starving for air pressure—you have to have a good air system on that truck to operate at its optimal performance,” Lucero explained. “We're also looking for any kind of fatigue on fittings, looking to make sure linkages are properly attached and not binding and are lubricated properly.”

Beyond the AMT itself, fleets will need to ensure that the electrical and air systems are up-and-running as spec'd.

“Whether electrically shifted or pneumatically shifted, data links have an important role in AMT operation,” Saholsky stated. “When not functioning properly, data links can cause undesirable vehicle launches and shifting issues after launch. Many new vehicles have an extremely high bus load on the data link, which can cause error messages if any of the electronic control units are improperly functioning or if the physical wiring of the data link has been compromised.”

Saholsky said that because newer vehicles in recent years have incorporated two different Baud Rate data links—250,000 and 500,000—previous issues surrounding this aspect of the system have been reduced.

Battery maintenance is crucial for electrically shifted AMTs, Saholsky reminded. Beyond monitoring and maintaining the battery itself, fleets should monitor the electrical system on a regular basis—staying mindful of warning signs like corrosion, wire chafing, and loose connections—which will affect AMT performance.

It is most likely that a shop is already equipped and tooled to handle AMT servicing. Though, there are considerations to keep in mind that may ease services and boost productivity.

“In general, there are no specific tools or equipment needed given that the basic design is the same as manual, with the addition of a virtual driver in the software for the transmission electronics,” Agebrand said. “Unique tools may exist on electronics and diagnostics depending on the OEM, but because electrification of certain components is occurring across the whole truck, there is really no difference between manual and AMTs in this sense.”

“There are different types of equipment that make life easier,” Lucero offered. “In a lot of our facilities, we have the luxury of having full truck lifts. We can lift the truck in the air to be able to drain fluids or pull the transmissions out if we need to.”

Diagnostics

It comes as no surprise that diagnostic software can help pinpoint AMT issues; but fleets should be aware of the different avenues of diagnostic services available to help maintain these systems.

TranSource leverages Mack GuardDog Connect to stay on top of Mack mDrive diagnostics.



» The advantages of AMTs are not fully realized without attentive and adequate maintenance.

TranSource

“It'll give us a lot of information... It goes through the Uptime Center, which will route that truck and that information to the closest dealer... Mack GuardDog Connect has a lot of value to it,” Lucero claimed. “It's constantly scanning that truck, and then if there's over-the-air programming that can improve [vehicle performance], then it'll try to do that first, of course, but it monitors everything on that truck and tries to optimize the uptime of that vehicle.”

Lucero explained that this information helps users make the most informed decision of when and where to service a vehicle, maximizing ever-valuable uptime.

Volvo's Agebrand attested to iShift's remote diagnostic capacity.

“The complete powertrain has full remote diagnostics and telematics support in a Volvo truck,” he said. “It is an 'iPhone on wheels,' and these kind of features and services will continue to develop for future products.”

TranSource also uses ASIST/Fleet from Decisiv as part of their diagnostic maintenance program. Lucero said that the specifically AMT-related things to look for when scanning a vehicle includes any active codes such as a shift denied, a neutral issue, or codes related to shift patterns.

“What we have found, though, is we don't generally see fault codes that are active like that when they're coming in for preventive maintenance on the automated transmissions,” he said.

Lucero said generally the reason the truck was brought in, either by tow or under its own power, was because the system “has given them a symptom, whether it's stuck in neutral, or it won't shift, or it's sluggish, or not pulling properly.”

When it comes to Eaton transmissions, Saholsky explained the in-shop and remote diagnostic capabilities available through ServiceRanger 4 and IntelliConnect, respectively.

“An AMT is a more technologically complex transmission,” Saholsky related. “Up-to-date diagnostic software is essential. Eaton's PC-based diagnostic software is called ServiceRanger 4. Every AMT has a fault code hierarchy which helps technicians quickly identify the faults that are most important. For instance, if a technician sees a range of high and low fault numbers, the tech-



» Eaton's Endurant HD automated transmission.

Eaton Cummins

nician can address the lower fault code number before moving up to the next highest number.”

Having a diagnostic system provide a plan of attack when servicing a vehicle in bay is advantageous; it is also helpful to have a diagnostic approach before the vehicle reaches a shop.

“With an AMT, a computer is essentially deciding when to shift gears and perform clutch actuations,” Saholsky said. “If the transmission system fails to perform as expected in the field, the ability to connect, diagnose, and repair from a remote location can help get the vehicle back up and running much faster. Eaton's remote diagnostics tool, IntelliConnect, helps monitor system performance, recognize fault codes, and initiate fault code action plans so fleets can better avoid catastrophic failures and costly downtime.

“IntelliConnect remote diagnostics technology is a suite of connected solutions designed to improve a fleet's uptime and efficiency and reduce the total cost of ownership,” Saholsky continued. “IntelliConnect provides near real-time monitoring of vehicle fault codes, prioritizes the critical events, and provides accurate and comprehensive action plans created by Eaton's technical experts. These features can help increase fleet uptime by reducing unplanned downtime and providing quicker repair diagnosis.”

Among IntelliConnect's newest feature set is the ability for users to monitor all vehicles associated with their fleet or view specific vehicles selected for a “Watch List” based on make or model, engine make, and even transmission model, Saholsky explained. IntelliConnect is included with every Eaton Cummins automated transmission.

To read about the lubrication needs of AMTs, visit: [FleetMaintenance.com/21238197](https://www.fleetmaintenance.com/21238197). ■

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The essentials of truck triage

Tips and tools to ensure maximum triage efficiency.

By Seth Skydel

[DIAGNOSTIC & REPAIR]

When a truck rolls into the shop with an issue, maintenance technicians know their goal is always to fix that vehicle correctly and get it back to work in a timely and cost-effective manner. How to go about that isn't always so clear, even with the power of modern diagnostic tools and streamlined triage processes.

"There's a difference between identifying a problem with a vehicle and identifying the cause,"



said Jake Schell, associate product manager, commercial vehicles, Mitchell 1. “Your diagnostics will be much more effective if you spend more time on the cause, treating the problem and not the symptoms. You’ll also spend less time overall, and you won’t have costly repeat repairs.”

Effective triage processes, or defining and addressing a truck’s severe issues in order to get it back on the asphalt battlefield, or escalate it to a more extensive repair, are the foundation of efficient maintenance service practices. By quickly determining a vehicle’s needs or the reason for an issue, shop throughput is enhanced and downtime is minimized. The key is in knowing all of the information that is available to service personnel.

With any diagnostics, whether it’s an electronic or mechanical system, information and input

» Just as triage is done in the back of this medic truck, maintenance facilities must also dedicate lanes to offer emergency assistance.

John Hitch | Fleet Maintenance

from drivers and the fleet are the key, Schell noted. Active and historical codes aren’t the whole story; the questions are what conditions were present when the code was set and does it happen all the time?

“That goes a long way toward tracking and identifying the problem and to the success of triage and diagnostics processes,” Schell stated. “For example, say a vehicle has a fault code indicating a problem with a fuel injector that is not working or is working intermittently. You replace the injector and it runs fine for 25,000 miles, but then it needs to be replaced again.

Finding fault with aftertreatment

Across the board, suppliers agree that many common faults on today’s highly advanced commercial vehicles originate from aftertreatment systems.

“We have over 30,000 clients running our diagnostic tools and using our web-based platforms for repair information,” said Tyler Robertson, CEO at Diesel Laptops. “Through them, we grab a lot of data, and every time we look at fault codes it is the same thing—derate fault codes occur the most. And then it comes down to failures that cause the derates, which are most often with emissions-related components.”

Jennifer Grabowski at Bosch Automotive Service Solutions also said DPF system fault codes tend to appear frequently in heavy-duty fleet vehicles. “Many heavy-duty code readers can validate the integrity of the DPF system and help determine if it is working properly,” she related. “It can also read the soot sensor to detect DPF failure, and it can be used to detect intermittent issues.”

Ideally, if the aftertreatment system is running correctly, a forced DPF regeneration should not be needed, but according to Jason Hedman at Noregon, it is most important for technicians to accurately diagnose these issues before unnecessarily forcing a regen in hope of correcting the problem.

“An unnecessary regen wastes time, puts undue stress on the truck, and renders the aftertreatment system too hot to repair, causing more downtime until it cools down,” he added. “Fortunately, however, when a forced regen is the solution to an aftertreatment issue, fleets can perform these over the air rather than calling a mobile repair service or routing the truck to a shop facility.”

It can be hard to say which codes are seen consistently, although regen problems and coolant temperature issues seem to appear in scan tools fairly often, noted Jake Schell, associate product manager, commercial vehicles, Mitchell 1. “[By tracking] codes over the long run,” he added, “fleets will see patterns and problems to address.”

“Now you need to ask if it was something else that was setting the code, such as a bad connector or the connection causing a voltage drop,” he continued. “It wasn’t a misdiagnosis that the injector was failing; it was why that wasn’t determined correctly.”

Incorrectly determining the cause of a problem has costly and time-consuming consequences. Not only does that ensure the truck ends up in the triage bay again, keeping it and the driver from making money—a shop’s reputation could be in jeopardy as well. To avoid repeat repairs, dedicated triage bays aim to promote uptime, but to do so they need to be set up and managed correctly.

The basics

The first thing to remember is that triage needs to be done quickly and efficiently, and that is accomplished by building a solid-yet-simple foundation. In the same way that first responders at an accident scene or field medics in the military can treat a host of issues out of a knapsack, a good triage technician can rely initially on a few basic tools.

“A battery tester and a diagnostic code reader are essential tools for any heavy-duty shop,” said Jennifer Grabowski, product manager, Bosch Automotive Service Solutions. “Before starting a diagnostic scan of the vehicle, a battery tester should be used to test the state of health and state of charge percentage of the battery. It’s important to make sure the battery is properly charged before using a diagnostic tool, as a low battery can generate erroneous trouble codes during a diagnostic scan.”

It is also crucial to complete a precise visual inspection and consider any details the driver or fleet shares about the vehicle, related Jason Hedman, product manager at Noregon. Then, an effective triage process combines a thorough vehicle scan with a diagnostic solution for all makes and models.

“Using a single application for triage, diagnosis, and troubleshooting makes the entire repair process more streamlined and efficient,” he explained further. “Rather than using countless component-based applications, a single application for all steps of maintenance simplifies training and gives technicians a holistic view, leading to a more effective triage process.”

Effective triage includes knowing which fault codes exist, the status of those faults, and when they occurred. And to do that you need software that will look at the entire vehicle, noted Diesel Laptops CEO Tyler Robertson. The vast majority of the commercial trucks on the road today are not vertically integrated. They have various manufacturers of brake systems, engines, transmissions, collision warning systems, and cab/chassis controllers.

“You need to make sure you have the proper software that allows you to connect to the vehicle one time, read all the data on all the components, and easily retrieve that data both locally and from a web-based platform,” he added.

Grabowski agreed. “A heavy-duty code reader for Classes 4-8 vehicles that can read and clear standard trouble codes is a must-have for any shop,” she stated. “It’s a portable, handheld device that can diagnose ABS, transmission, and engine issues quickly, and it can help troubleshoot the complexity of the issue and help technicians determine if it is easily fixed or may require a fuller diagnostic scan.”

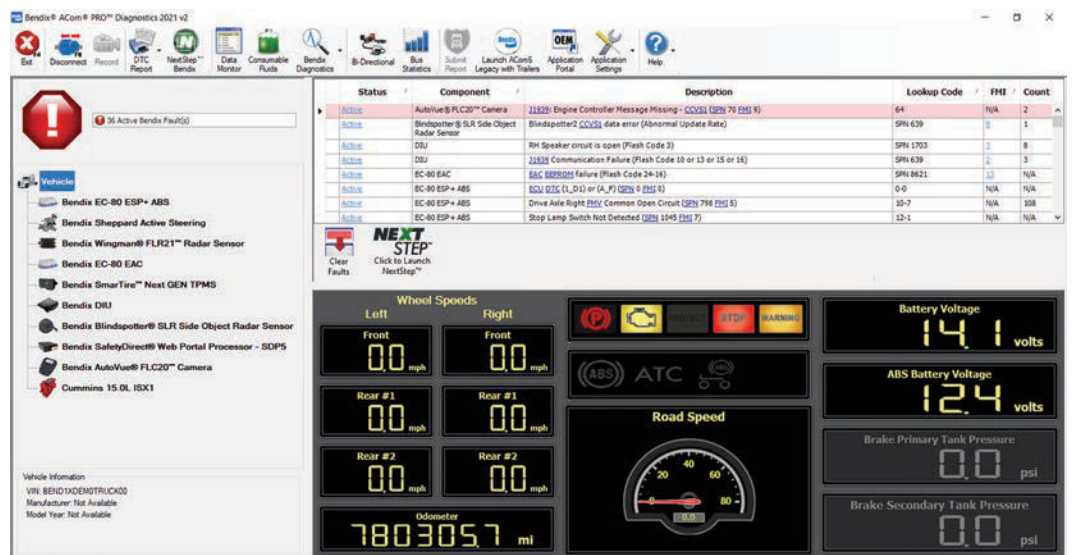
A portable tool can also be used to diagnose issues in the field and help identify quick fixes to keep trucks on the road and minimize downtime, she added. A heavy-duty code reader is not a replacement for a full function bidirectional heavy-duty diagnostic system, but it can quickly pull codes, as well as read, record, and playback live data streams for further analysis and diagnosis.

With diagnostic software tools, a roll call of all vehicle ECUs can be taken at startup, according to



» Once diagnostic triage is complete, a technician has a better idea on how to repair an issue.

Rush Enterprises



» The Acom Pro Diagnostics dashboard provides a detailed health report of Bendix systems and components on a truck.

Bendix

T.J. Thomas, director of marketing and customer solutions, Controls Group, at Bendix. “We recommend that technicians use a systems approach and review all diagnostic trouble codes (DTCs) before diving into any one active DTC, because many are interrelated,” he said. “For example, if a J1939 active DTC is reported by the vehicle controller and the forward-looking radar, we would recommend troubleshooting the vehicle DTC first; then rerun the software to see if that also addressed the radar DTC.”

“Diagnostic software can generate very comprehensive reports that show important component information, active and inactive DTCs, and other event information,” Thomas continued. “The reports can be run before and after troubleshooting has been completed to enable a clear understanding of some of the critical information on the vehicle before and after it entered the shop. This can be very helpful when reviewing vehicle records for trends at a later time.”

Streamlining repair through remote diagnostics

With the advanced communication and internal diagnostics onboard modern trucks, the triage can technically start even before the truck gets to the repair facility.

“Remote diagnostics is the next evolution of where our industry is going,” Robertson said. “In the traditional model, everything is reactive and repair shops make the decisions on when trucks can be looked at, who looks at them, and what procedural steps should be done. While OEM dealerships can manage this for the brands they represent, it gets far more complicated for them when working on different makes, and at independent repair facilities.”

In any case, all vehicle repair operations face similar challenges, Robertson noted. This includes having access to repair information, proper diagnostic tools, knowledgeable technicians, and the needed repair parts. The diagnostic procedure and decision making process can start much earlier by moving the information gathering and diagnostic procedures to call centers. They are able to grab the data as the vehicle is driving down the road,

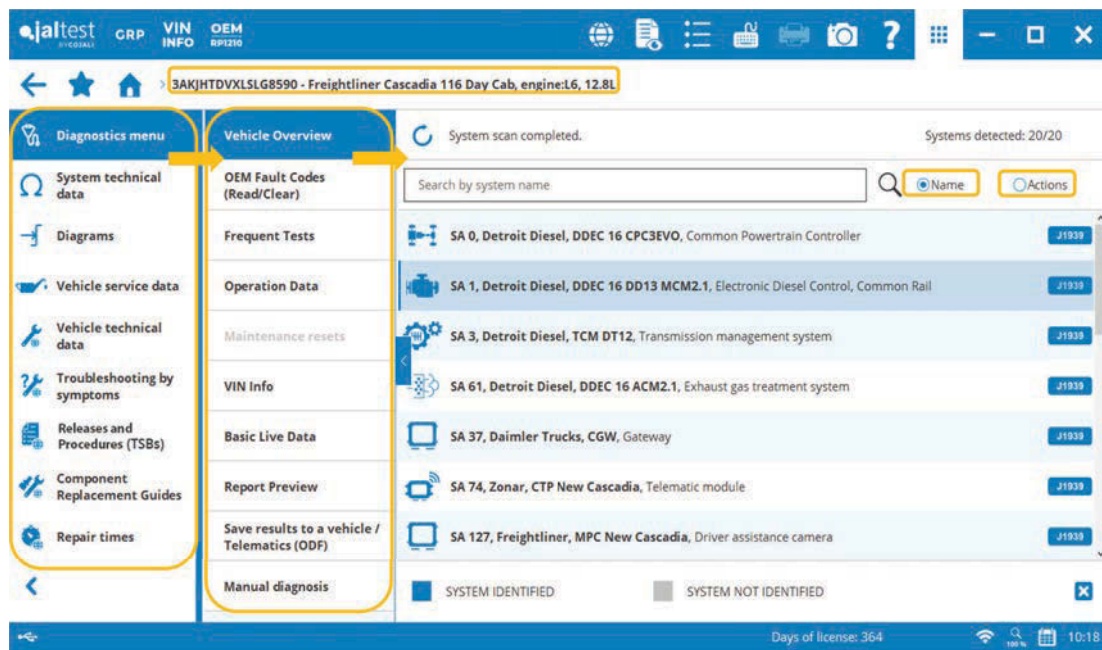
One-Click To Repair Them All One-Click Diagnostics With Jaltest

Nowadays, Diagnostics is a must in the repair shop. Vehicles are getting increasingly complicated with dozens of electronically-controlled modules on board. These ECMs need to be analyzed, calibrated, installed, and reset. This means that every physical interaction in the repair process is requiring and will continue to require a digital action. Due to this, in order to perform any repair or maintenance action, the vehicle needs to be connected or paired with a diagnostics tool. For example, after a DPF job the truck needs a reset, which can be performed with a dealer-level diagnostics tool.

Dealer-level diagnostics means the technician has access to the tools to repair all the way through. There are no limitations when it comes to advanced procedures such as calibrations, regens, resets, and other parameters changes. Because of this, technicians used to have only one option, which was sending the truck to the dealer shop. Instead, times have evolved, and anybody can purchase a dealer-level diagnostics tool. The right diagnostics tool needs to be that second mechanic, the one that looks for the operating specs, the one that remembers how the procedure to change the oil temperature sensor was or the one that knows where the wires hook up.

Jaltest Diagnostics is a Dealer-Level, All-Makes, and All-Models Diagnostics tool that is designed to walk the technician through the repair process. The user may start out from a one-minute scan to detecting all the systems present in the truck. Analyzing all and ending with the report of all fault codes, being these active or not, tests, and any actions that were undertaken while connected. The intuitive layout goes from left to right and comprehends all the necessary information the technician needs within the same screen (screenshot for reference).

Jaltest is a tool that walks you through the repair process by integrating all the difficult to get, yet crucial, technical data inside the software, adding images, component locations and



exchange guides, troubleshooting trees by fault codes and symptoms, and so much more! By integrating everything, the technician doesn't have to look any further. This saves a lot of time and money in the long haul and boosts the productivity of the technicians.

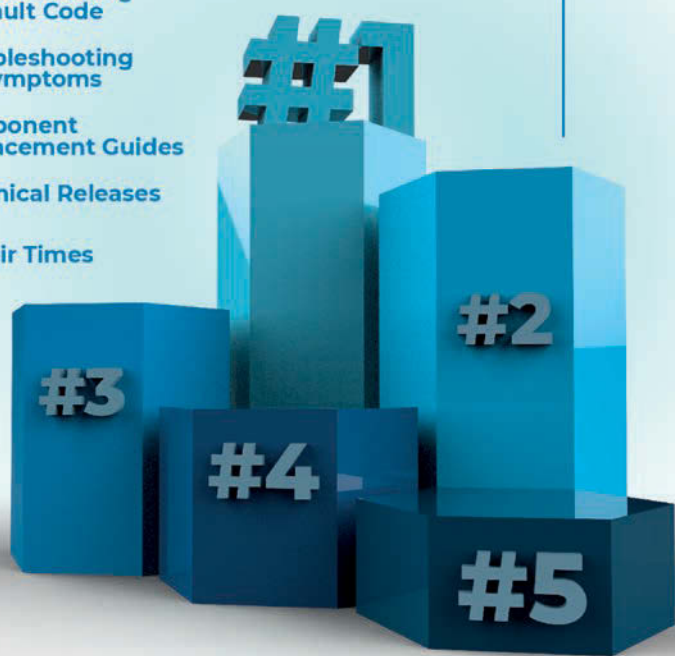
Indeed, tackling downtime and boosting labor productivity are Jaltest's priority while developing its ever-evolving software. Jaltest pays attention to what the technician's logic is while looking for answers to the repair in process. This proves to be extremely helpful in reducing the users learning curve. We are aware of the shortage of diesel technicians in our country, not to mention of the fleet's hurdles to find and retain the good ones. By using a diagnostics software that is intuitive and capable of showing the search functions, the technical information, and the content structure that is identical no matter what truck is connected, that learning curve is hugely reduced, and the technician feels in cahoots with the resources left at his fingertips. The simpler the process is, the faster they will learn how to be proficient with the tool, and the faster they will be able to get the fleet vehicles back on the road.

Finally, in line with reducing downtime to the limit, Jaltest is the only diagnostics tool that contains an integrated full repair and technical information platform. This is a huge time and money saver! Technicians who work with Jaltest don't need to go on to another interface to manually check for the manufacturer's specs when they need to, nor call the dealer, nor search the web hoping Google has an answer for him. Instead, the process is drastically shortened thanks to the integrated information that provides access to troubleshooting guides, component replacement guides, vehicle technical data, TSB's and more.

If you want to learn more about Jaltest Repair Information platform, check out the series: Info Online. These are five short episodes where the viewer can see what the platform looks like, how the information is displayed, and how solutions are applied. Browse it, Find it and Get it Fixed!

OUR USERS' PREFERRED FEATURES

- #1 Troubleshooting By Fault Code
- #2 Troubleshooting By Symptoms
- #3 Component Replacement Guides
- #4 Technical Releases
- #5 Repair Times



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which leads to better repair plans and more efficiency throughout the service process.

“By working with software providers that can monitor vehicle data remotely and help analyze the information, fleets can save a tremendous amount of downtime by getting ahead of the problem instead of being reactive or ignoring the problem until it becomes too late,” Robertson added.

Hedman agreed that remote diagnostics make it possible to begin triage before a truck ever arrives at the service center. The early start lets users download comprehensive diagnostic reports that can be sent to the shop to begin planning parts, bay, and technician needs ahead of the vehicle’s arrival.

“This approach generates major uptime improvements for fleets by helping to ensure they don’t route the truck to a facility unable to perform the work,” he added. “Remote diagnostics can also ease the burden on shops by empowering fleets to perform certain repairs over the air, such as sending bidirectional commands to correct an issue and avoid a roadside service call.”

For Thomas, remote diagnostics are aimed at helping the fleet or repair shop understand what DTCs may be active, their priority, and where they can be fixed while the vehicle is on the road. He advised fleet operations to work closely with telematics suppliers to make sure they are taking full advantage of these more advanced features.

“Remote diagnostic technology can potentially help technicians and shop managers prepare for and schedule repairs in advance,” Grabowski added. “At the same time, portable scan tools can complement remote diagnostics, because they can easily provide a more detailed and more accurate view of a vehicle’s condition or potential issues in a shop or in the field, and that can triage vehicle issues more quickly.”

At Rush Truck Centers, remote diagnostics are used in multiple ways. “Knowing fault codes in advance can help the dealership schedule technician capacity, validate parts inventory, and better prepare to minimize customer downtime,” said Victor Cummings, vice president of service operations at Rush Enterprises. “That’s why we’re currently investing in remote diagnostics technology.”

Chase Bowman, vice president of operations at AM PM Diesel Services, a Houston-based firm that fields over 30 fully-outfitted service vehicles in ten major markets, said remote diagnostics are allowing a first look at what parts will be potentially needed for a repair and how fast they can be acquired. In addition, they are used to determine what skill level a technician needs to be assigned to repair the vehicle.

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Dropping downtime and upping throughput

"Our service team's goals are to initiate triage within two hours of arrival and provide an update within four hours," said Cummings of Rush's best practice target. "The intent is to perform a preliminary assessment of each vehicle as it arrives, with a triage

technician determining the complexity of the issue."

That first technician assigned to the vehicle can then jump into action or allocate the repair to a specialist.

"Simple repairs can then be completed by the triage technician or an accelerated repair technician," Cummings said. "More complex repairs that require extensive diagnostics are reassigned to the

appropriate technician with expert diagnostic and repair skill sets."

At AM PM Diesel Services, noted Bowman, best practices are to first diagnose each unit using Fullbay software and a range of diagnostic tools, and then find out how fast parts can be available. That way, a service order can be created in Fullbay and a technician can be assigned based on the repair type.

From there, the service provider can organize repairs based on time and parts availability. "Of course, we also will move units up and down the repair priority list based on our customers' needs," he added.

At Rush Truck Centers dealerships, Cummings also pointed out that guides are available to all service personnel on the company intranet. New service employees also receive check-in process training as part of the company's onboarding process, and supervisors may assign training as well. Additionally, Rush Enterprises conducts workshops with dealership personnel to provide guidance on the overall triage process.

"Technician training is the key to, and a huge advantage for, diagnosis and seeing what's going on with the vehicle," Schell noted. "Diagnostics is just data; it's the knowledge to know what it means and having a strategic approach to interpreting that information that should be a focus of education for technicians. The more connected vehicles become, the smarter we need to be."

"Any efficient shop operation requires an effective triage process," said Hedman. "If triage is not performed correctly, labor or parts estimates can be inaccurate, causing longer downtime than expected and potentially depleting a shop's resources that are needed to work on other vehicles." ■

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New SL24EVT Battery Pack Lift Makes Servicing Electric Vehicles Safer, Easier and More Efficient

BendPak's patent-pending new SL24EVT EV battery pack and powertrain lifting system helps technicians safely and efficiently remove, service and install heavy battery packs from a wide range of electric vehicles. And thanks to an innovative design that supports a full line of available accessories, it also doubles as a powertrain lift for internal combustion vehicles.

The SL24EVT is compact and portable, with a pallet-jack type steering wheel and oversized urethane casters engineered to provide low rolling resistance and unparalleled maneuverability anywhere in the shop. With a press of the button on the pendant controller, the SL24EVT elevates to more than 6 feet in less than 20 seconds. The lift table securely supports an industry-leading 2,400 pounds on its oversized 40 x 60-inch cushioned rubber platform, providing stability throughout battery replacement, repair, recycling and material handling procedures.

"We were inspired to develop the SL24EVT lifting system after seeing some of the creative do-it-yourself solutions technicians were using to remove EV battery packs weighing more than 1,000 pounds," explains Jeff Kritzer, BendPak executive vice president. "BendPak's SL24EVT eliminates



any manual lifting or lowering of the battery pack and makes it easy to securely move the pack around the shop without worry."

Like the electric vehicles it supports, the SL24EVT EV battery pack and powertrain lifting system is battery powered. It uses a maintenance-free 12-volt deep-cycle battery featuring proprietary, high-density grid technology precisely engineered to deliver outstanding performance. A fully automatic three-stage battery charger offers connect-and-forget operation to protect against overcharging. An integrated thermal sensor detects ambient temperature and adjusts the 15-amp output to prevent overcharging in hotter areas and undercharging in cold climates.

Full-length utility trays provide ample storage for tools and fasteners during all stages of service and battery pack removal. Sixteen recessed mounting anchors in the lift platform surface accommodate a variety of modular fixtures, adapters and accessories that can be added, repositioned, or removed as needed to handle engines, transmissions, gas tanks, transaxle assemblies and more.

Available add-ons include:

- Telescoping arm kit provides multi-configurable support of large, heavy and awkward vehicle components.
- Multi-point adapter safely supports components like axles, transfer cases and bumpers.
- Tilt deck makes it possible to tilt the table surface side-to-side and fore and aft for more precise alignment of electric batteries, engine and drivetrain assemblies, fuel tanks and more.
- Adjustable Accu-Point support fixtures are independently adjustable arms that can be adapted to nearly any transmission, drivetrain or vehicle subframe shape.
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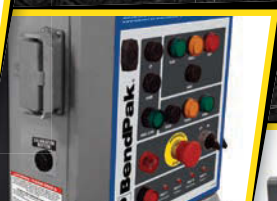
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REACHING

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FUEL-EFFICIENCY


Even though the trucking industry is always evolving, two things are always the same for a successful over-the-road fleet. First, those Class 8 tractor-trailers must get to where they're going safely, on time, and with the least amount of energy necessary. And second, fleets must attempt to spend the least amount of money and time maintaining that equipment to consistently achieve those results. If there's a third thing, it's that neither No. 1 nor No. 2 are as easy to pull off as they sound. Government regulations, economic ebbs and flows, and an evaporating labor pool all threaten to dash even the best laid truck business plans. But with the tried-and-true philosophy of "working smarter; not harder," or more specifically, emphasizing fuel efficiency in every facet of the fleet, a trucking company at least has a chance.

K

With the right maintenance strategy emphasizing fuel efficiency, a fleet can have it all: better fuel economy, more uptime, and lower maintenance costs.

By John Hitch

[EMISSIONS & EFFICIENCY]



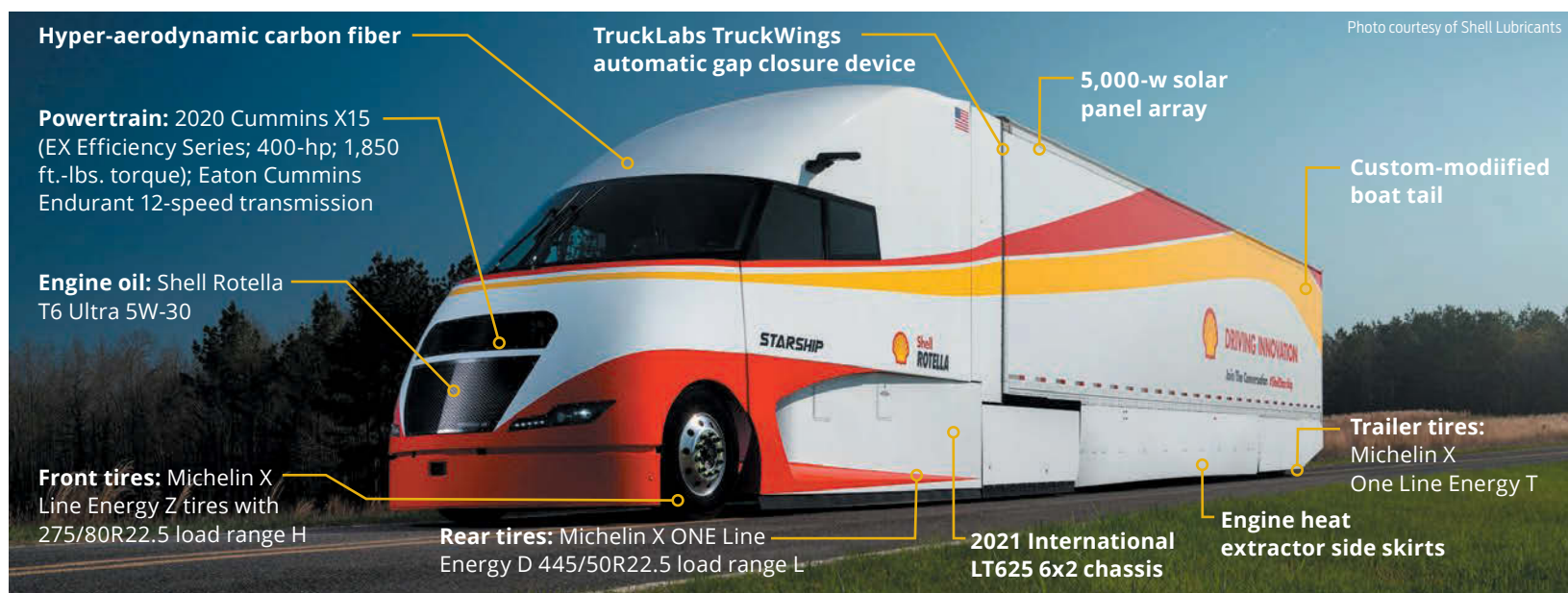
The North American Council for Freight Efficiency identified several areas that can impact fuel efficiency, releasing a vast library of confidence reports and guidance on crucial areas ranging from the powertrain and low-viscosity engine oils to low rolling resistance tires and aero kits. The 2019 Annual Fuel Study detailed how using a wide swath of available fuel-efficiency technologies affected the 21 participating fleets' fuel costs. The 73,844 trucks involved "saved \$895,318,953 in 2018 compared to the average trucks on the road," according to the report. Collectively, these trucks averaged 7.27 mpg; the national average for the previous year was 5.98 mpg.

It's a major reason OEMs have eschewed their classic tough-guy exterior look for sleeker bodies. Just look at Kenworth and Peterbilt trucks. The

Paccar-owned truck makers both launched updated versions of their flagship OTR haulers in early 2021. With additions such as the updated Paccar integrated powertrain over the 2017 MX-13, larger air dams, and narrower hood, the Peterbilt Model 579 betters its predecessor's fuel efficiency by 7%. For the T680 Next Gen, Kenworth added a new aero bumper and hood, lower fairing extensions, 28-inch side extenders (and more), which can lead

Photo courtesy of Mack Trucks

Anatomy of the Shell Starship 2.0 hyper-fuel-efficient truck



to a 6% improvement in fuel economy over the classic T680.

Over at Mack Trucks, the Anthem Advanced Aerodynamics Package leverages the MP8HE/mDrive integrated powertrain, along with aero tweaks such as a bumper air dam and close out flanges, and adjustable cab fairing (to optimize airflow for various trailer heights), to reach 15-16% better fuel efficiency than older Anthems. Some trucks regularly hit nearly 11 mpg.

The big thing to realize is what happens on the road with the driver and what happens in the shop are inextricably linked. Trucking is a team sport, with drivers as the offense and technicians as the defense. A driver culture where aggressive behavior, such as excessive and undulating speeds are accepted, strains the finely tuned, sophisticated equipment, and creates extra work for the shop.

“If you’re burning less fuel, you are being gentler on the power plant, and it requires less maintenance,” explained Mike Roeth, executive director of NACFE. “If you’re not hitting the brakes and then accelerating, or making a lot of lane changes,

all those kinds of things create better fuel economy, and you get a benefit in maintenance.”

The reverse is also true: NACFE’s 2016 confidence report on truck maintenance’s impact on fuel efficiency, in which 12 fleets were canvassed, revealed “fuel consumption improvements of 5 to 10% after the implementation of rigorous preventive maintenance practices.”

And those savings could be put to good use by reinvesting in new technology or talent to ensure better uptime.

“We believe it to this day that with fuel prices like we’re at now, it’s enough that it could help fund a fleet to have a better maintenance program, either by hiring another person, or by putting in place a good maintenance software system,” Roeth said.

Other benefits of maintaining fuel-efficiency related equipment the report mentioned included more uptime, higher resale value, better driver safety and satisfaction, and a reduction in CSA violations and fines.

Before the report, which is slated to have an update by the end of 2021, Roeth said many fleets

dismissed the symbiotic relationship.

“No, they’re separate things—you fix things, you repair things, and you maintain things on a truck to keep the truck running,” Roeth recalled of the general sentiment.

“But a down truck is not efficient,” he added, “so the linkage between a good maintenance program and the mpg or the efficiency of the truck is important; people didn’t really get it until we started digging into it in that first report.”

The report singled out 10 specific areas to build a maintenance strategy around to key in on:

1. Lubricants/Engine Oil
2. Intake/Exhaust System and Diesel Particulate Filters
3. Engine Cooling
4. Air Compressors
5. Wheel Alignment
6. Tires
7. Fuel Filter Systems
8. Aerodynamic Devices
9. Electrical Systems
10. Air Conditioning

Quick tips for maintaining fuel-efficient equipment



AERODYNAMICS

According to TMC RP 1110, aero improvements may impact the cooling of transmissions by directing air flow away from the bearings, seals, and gears. The recommendation is to veer from gear oils and use SAE 50 weight engine oils in the transmission instead. Spec’ing oil coolers on engines over 350 HP will also help.



AFTERTREATMENT

Donaldson found that blockage in the air filter can lead to excess soot production, which leads to faster loading of the DPF and more regeneration cycles. More fuel is burned to increase the temperature to create those regens. Optimizing service of the air filter can alleviate this. NACFE also found poorly maintained intake and exhaust systems can decrease fuel efficiency by 5%.



ENGINE OIL

Going over the recommended oil level may cause oil churning and spin losses, which according to Cummins can reduce fuel economy by up to 2%. Also, ensure

maintenance staff and drivers are aware which engines can receive FA-4 oils, which unlike CK-4 are not backwards compatible.



ALIGNMENT

A misaligned wheel that deviates only 1/4 degree from straight travels an extra 10 to 15 feet sideways for each mile. Misalignments also increase rolling resistance and cause engines to work harder to overcome drag. Cummins testing showed misalignments can reduce fuel efficiency from 0.6% to 2.2%.



TIRES

According to Continental, a properly inflated tire gets 1% better fuel efficiency than one underinflated by 10%, and that on average, 34% of a fleet’s tires are underinflated. Tire pressure monitoring systems, handheld digital pressure gauges, and fixed rollover devices at the yard can all quickly check status and record the data in a maintenance system.

Combined, issues in these areas could impact 30 to 50% of fuel consumption, though the report notes that no truck would conceivably have problems with all of them at the same time. But the intent was to point out even minor problems on small components add up over time.

Roeth explained simple things like lubricating the fifth wheel can pay off: "If you've got a sticky fifth wheel, it might dogleg the tractor-trailer a little bit." This would lead to a less aerodynamic profile and more tire wear.

And oftentimes it only takes a little extra attention to preventive maintenance and inspections, from checking air filters and engine oil purity to the truck's alignment.

"The more you maintain the truck and address issues, from rattles on aerodynamic devices, clogged diesel particulate filter or any other filter, or air leaks in the charge air cooler system, those things all lead to a little better fuel economy," Roeth said.

And if the goals of the shop and operations side are aligned, the trucks should be better positioned to reach a clean bill of health and maximize fuel efficiency benefits.

But how to achieve ultimate fuel efficiency is easier said than done, as well. It is possible with a smart approach from the get-go, and remembering not to hit the brakes on monitoring a truck's fuel efficiency after a year or two of service.

"The first thing is to start off on the right foot with the right equipment," said Daryl Bear, lead engineer and COO of Mesilla Valley Transportation Solutions. "Spec'ing the most fuel-efficient vehicle, and having a strong maintenance team that'll keep it up, that's a winning package."

After all, what good is spec'ing the best engine or low rolling resistance tires if routinely clogged filters or underinflated tires negatively undo any positive gains?

"The maintenance team is really the group that has to deal with whatever the powers that be decided to put on the equipment," Bear continued. "So having a strong maintenance team and good practices—and just maintenance people who care—makes a huge difference in the fleet, and really makes a huge difference in what you can adopt from a fuel economy perspective."

Starting off right

For an aspirational look at what is possible, look no further than the Shell Starship 2.0 results, which NACFE assisted in validating. Fitted with the latest advances in engine oil, aerodynamics, powertrain, and more, the "hyper-fuel-efficient truck," as Shell Lubricants called it, achieved a 10.8 mpg average while hauling 47,100 lbs. of artificial coral reef from

San Diego to Jacksonville, Florida, this past summer. This was an improvement of 21% over the 2018 run of 8.94 mpg, and was due to upgrades in the chassis (from a 2015 International ProStar to 2021 LT) and powertrain (from prototype 2015 Cummins X15 to the mature 2020 X15 Efficiency Series), along with aerodynamic tweaks, such as adding the TruckLabs TruckWings automated tractor-trailer gap sealer.

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Fleets aren't in the position to spec carbon-fiber, bullet-shaped cabs, but most of the other equipment is available for OTR fleets. And when spec'ing a new truck, a cost-benefit analysis should be done. With LRR tires in particular, a fleet should consider not only rolling resistance, but durability. What works for one fleet might not be the best for another.

"Every fleet's balance between efficiency and

reliability is different," Bear noted. "Some fleets will deal with some more maintenance issues if it means they'll get half mile per gallon better fuel economy, but some other fleets' timing is so critical, that they'd rather lose on fuel efficiency to make sure that the load is delivered."

Mesilla Valley Transportation Solutions, a spinoff venture from Mesilla Valley Transportation, uses

racecar testing methods to validate equipment such as aerodynamic kits and LRR tires for the manufacturers and trucking fleets interested in making large orders.

Bear said MVT leadership and the maintenance department are in regular communication before and after spec'ing to ensure what they thought was the right decision really was.

The fleet switched back to dual tires from singles even after being "a big proponent of wide base tires," Bear said, noting this was due to "a combination of the fuel efficiency and duals getting a lot better and closing that gap."

In general, reaching peak fuel efficiency requires constant research and validation.

"There are a lot of specs out there to improve fuel economy, but trucking fleets are really not aware of how good they are," said Bear, stressing that the industry needs to educate itself on what gains can truly be made.

Those gains can be substantial just with some aero additions. Recently, both FlowBelow and Transtex touted the fuel efficiency scores their equipment received from MVTs.. FlowBelow's Tractor Aero Kit, which closes the gap between tractor wheel to reduce drag, came in at 2.13% better than the same truck without it, while its tractor and trailer wheel covers improved fuel efficiency by 0.93% and 0.81%, respectively.

FlowBelow's devices are relatively easy to clean and remove for tire service, said Marcus Myers, vice president of maintenance at Gulf Relay. He did say a newer design on the Freightliner version necessitated also spec'ing air release fifth wheels for better accessibility. "Some drivers have had trouble reaching the release handle with the current design," Myers said.

The Transtex Edge Elite Aero System, which comprises mudflaps, a few bolted-on flexible trailer skirts, and discrete aero fairings at the top and sides of the trailer backend, yielded a 1.2 mpg improvement, or a 10.49% gain.

Trailer skirts might be great at reducing drag, but if drivers are returning them damaged so often that they have become a major drag on the maintenance operations, then is it such a wise investment? Here, questions on durability should be answered before attaching them to hundreds or thousands of trailers.

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The Transtex skirts are made of Nylon 66, so they will flex and return to their original shape upon less extreme impact.

Bear noted that trailer boat tails can create “headaches” for maintenance personnel. MVT factory installs Michelin’s Energy Guard aerodynamic solution because it provides fuel efficiency (10 gallons per 1,000 miles) while resisting damage. “There’s nothing hanging off the back of a trailer with the Michelin kit, so there’s just much less opportunity for damage,” Bear said. “And then there’s no driver interaction and then just no moving parts.”

Because of their skirt ruggedness, Myers said Gulf Relay is also going to adopt the Michelin solution on its next order of trailers. “They’re almost collapsible brackets that will pop back into place, so we’re going to give them a shot—they might put those headaches to rest.”

The numbers add up

A fleet, however, doesn’t need to look for homeruns with every spec. Bear said getting a fleet to achieve a 0.3 or 0.4% increase in fuel efficiency could be huge win: “When you do 150 million miles a year, it adds up pretty quick.” MVT’s logistics fleet has 1,500 trucks—if they all traveled 100,000 miles a year, they would reach that exorbitant number.

At the time of writing this, the U.S. national average diesel price was \$3.30, so a 0.3% increase represents about a penny a gallon. Factoring for



» Mesilla Valley Transportation found that switching from wide-base to dual tires proved a better mix of efficiency and reliability.

Photo courtesy of MVTs

a 7-mpg fleet average, that equals \$707,142 in savings over 150 million miles.

When spec’ing powertrains, along with weighing performance and efficiency benefits, a fleet must also decide what type of engine oil to use.

Switching from a 15W-40 to a 10W-30 grade will likely yield better fuel efficiency. “The thinner the oil, the easier it is to flow, the less input energy it takes for parts to move against each other,” said Karin Haumann, OEM technical manager with Shell Global Solutions. “The increased fuel economy comes from that.”

A fleet called Boaty’s Transport said it got 2% better fuel efficiency with Chevron Delo 400

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ZFA 10W30 (FA-4), while also seeing wear and oxidation control benefits. “The combination of engine protection and improved fuel efficiency is a real plus in helping us manage our costs in this competitive business,” Boaty’s owner Michael Boatwright said.

Another offering, Delo 600ADF, also reduces aftertreatment maintenance due to 0.4% ash content.

Consulting OEM standards is crucial, as not all engines are rated for the FA-4 standard, which can offer more fuel efficiency benefits than CK-4, but not backwards compatible like CK-4 is. Going from a 15W-40 to a CK-4 10W-30 offers a 2% improvement in fuel economy, and an FA-4 10W-30 while FA-4 can provide a 2.5% gain, Haumann explained.

Here, the balance might shift to what is easiest for fleets’ maintenance facilities.

“I’m not a fan of having multiple oils for different trucks, it just adds a lot of confusion,” said Paul Pettit, vice president of maintenance at Dart Transit. The Minneapolis-based fleet uses trucks from three different OEMs in its fleet of 1,100, and switched from 15W-40 to a 10W-30 (CK-4).

“We got everybody on the most efficient oil for the newer trucks that would still be compatible with the older trucks,” Pettit said.

Maintaining the efficiency

Now, the owner or president of a fleet might salivate over the potential slashing of percentage

points off an annual fleet fuel bill, but as Bear noted, the true path to maximum fuel efficiency is the one that can be consistently maintained.

The first option is to entrust the dealer network with the heavy lifting.

Mack recently announced the Mack Premium Service Agreement for new trucks and those who have not hit their first service interval. The service places a keen focus on fuel efficiency and includes scheduled powertrain, aftertreatment, and axle maintenance, along with a 74-point inspection and oil analysis.

“It’s really to get you to stay on plan,” said Stu Russolli, Mack Trucks highway product manager. “Now you know you have all that paid for—are you not going to get the truck in? You don’t have an excuse.”

MVT uses Penske for maintenance, along with its own dedicated inspection group.

“They go bumper to bumper, and underneath as well,” Bear said. “So they’re checking, obviously, if anything’s broken, but otherwise, the tread depths, and of course, we’re looking at whether oil needs to be changed and things like that.”

When MVT handled everything internally, he said the company gave the maintenance team bonuses for meeting fuel efficiency goals.

Dart reviews fuel efficiency performance every other month or so, identifying potential issues and addressing them at the next PM interval, Pettit said. Dart then puts the focus on how drivers

might be making it more difficult on the maintenance side by seeing if anyone is behaving beyond what is expected in terms of efficiency.

“We use our telematics to review them on a truck-by-truck basis versus looking at one specific make model year and seeing how that entire model year is looking,” Pettit said. “From there, we look at what kind of outliers we are having, and if that idle percentage is driving fuel economy down or anything like that and try to work towards educating drivers where we can on how to reduce idle.”

According to NACFE, a 10% annual reduction equals 1% in fuel economy, while the American Trucking Associations estimated that idling creates twice the wear and tear on the engine parts that driving does.

Gulf’s Myers also said his fleet looks at fuel efficiency-gear PMs every other month, but for certain items they “have to be proactive.”

“Fuel filters are really your biggest challenge,” Myers said. “We’ve battled some different issues with algae buildup.” They use Mack Virtual Technician with OneCall to diagnose fault codes, and also calibrated parameters to monitor idle time.

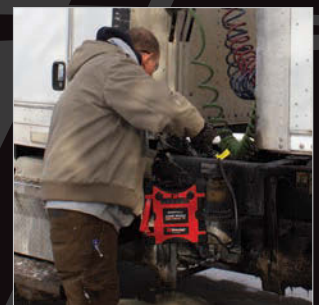
Myers’ final piece of advice on how to improve fuel efficiency through maintenance? “Find good drivers,” he concluded. ▀

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The Value of the Technician



In the labor market of today, a company's biggest asset has truly become its employees. With the severe shortage of available labor, the recruitment and retention of employees is paramount to success. As shops struggle to fill open vacancies the problem becomes having enough billable hours to create a monthly revenue stream that is profitable.

The modern technician is looking for a shop that provides great pay, a stable future, and the best working environment possible. It is imperative for shops to offer the technician a shop with the most modern and up to date equipment, making their job easier and safer. Nate Weston, a technician at Gray Diesel in Lincoln, NE explains, "when our shop went to Gray's WPLS mobile column lifts, high rise component jacks and other new equipment, I had my doubts, I thought changing the way I worked would slow me down, what it actually did was make my job at least 75% easier and

I am now getting twice the work done in a day." This comment illustrates how new equipment can ROI itself in a shop. By allowing a technician to get more done in less time a shop is able to produce more throughput with its existing staff. Also, Dave Hunt, the Service Manager at the Lincoln shop, explains recruiting new technicians is an easier task when they walk in and see the modern equipment. The moral of the story is do not overlook how your shop's jacks, lifts and component jacks effect the recruitment, productivity, and safety of your technicians. Gray Manufacturing Company, an American manufacturer of professional shop equipment is available to help you make sure your shop equipment is up to industry standards.

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» It is important to keep DEF clear of impurities and contamination to avoid issues.

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Dealing with dirty DEF

Best practices to help fleets preserve the purity of their diesel exhaust fluid.

By Gregg Wartgow

The American Petroleum Institute (API) has been licensing DEF (diesel exhaust fluid) since 2009, and despite its longtime existence, DEF continues to cause some issues for fleets.

“DEF is highly sensitive to impurities and contamination such as chemicals, coolants, engine oil, and water,” said Cornelius Jones, regional technical expert for transportation at Shell Lubricants, a company which produces diesel exhaust fluid, along with engine oils and other lubricants. “DEF is also corrosive to certain metals such as steel, iron, zinc, nickel, copper, aluminum, and magnesium.”

As Haumann pointed out, DEF contamination can occur during any of the following:

- ➔ Accidentally mixing DEF with diesel fuel
- ➔ Not using a DEF-dedicated pump, hose, and nozzle
- ➔ Not using a DEF-dedicated storage container
- ➔ Using a container made of one of the above-mentioned metals

“DEF is manufactured from an automotive/ medicinal grade of urea dissolved in deionized

water,” explained Jay Gagnon, senior product manager for BlueDEF diesel exhaust fluid and dispensing equipment at Old World Industries. “The solution must contain 32.5% urea and 67.5% water.”

That sounds relatively simple, but there is more complexity to DEF than those two basic ingredients. And with complexity comes more opportunity for human error.

“The standard behind DEF is a ‘purity’ spec,” said Jeffrey Harmening, a manager with the API whose areas of responsibility include engine oil and DEF. “There is actually a lot more to DEF than just urea concentration. There are roughly 15 other physical and chemical properties that are essential to maintaining DEF quality.”

Problems when purity is compromised

The bottom line is that technicians and drivers should pay close attention to DEF purity. If the purity level doesn’t meet the proper specification (ISO 22241), Harmening said a fleet could run into issues like deposit formation, corrosion, catalyst blockage, and injector or filter clogging, which will affect dosage rates. When dosage rates are affected, the aftertreatment system’s ability to reduce NOx is impeded and sensors may trip. All of this can lead to increased downtime and costly repairs.

One sign of potential DEF contamination is poor engine performance. A fault code can also light up the malfunction indicator lamp. In extreme cases, the engine will go into a derate mode. “Then the fleet may have to send the vehicle into a dealer for the DEF system to be cleaned,” Gagnon said. “Worst case, replacement of expensive system components may even be necessary.”

Catalyst fouling is another possible byproduct of dirty DEF. Deposit buildup has long been a challenge with many DEF products. For fleets capitalizing on the growth in last-mile delivery, that challenge has only become greater.

“In sub-optimal operating conditions, deposit formation can negatively impact exhaust system durability by the formation of solids (cyanuric acid



» Offered in a 2.5-gallon container, Shell Rotella DEF meets the stringent requirements of ISO 22241 and is API-registered as a certified DEF.

Shell Lubricants

or ammelide) on the exhaust wall, thus degrading performance of the SCR catalyst,” Gagnon explained. “These deposits can also increase backpressure which can decrease fuel economy and reduce engine power. Low-speed operation, extended idling, and frequent stop-and-go operation all prevent the exhaust system from reaching and maintaining optimum operating temperatures. That contributes to deposit buildup in the SCR system.”

Tips for fleets to preserve DEF purity

Even when DEF has been manufactured to the highest standards, contamination can still occur. Gagnon explained that incorrect storage, handling, and dispensing practices are the largest contributors to DEF contamination.

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Old World Industries



First of all, there is a simple way for fleets to feel confident in the DEF they are purchasing.

“Since the composition of DEF is strictly controlled by ISO 22241, and in North America each manufacturer’s fluid is certified by the API, packaging for DEF should carry both the ISO artwork and API logo to verify that it has been manufactured correctly and in the right formulation,” Gagnon explained.

Fleets could also look for additional assurances. BlueDEF products, for example, also feature a batch code number printed on the package. “Our batch code is a fleet’s assurance that the DEF is pure and has been tested to meet or exceed the strictest OEM standards,” Gagnon said.

Similarly, DEF shipping containers such as drums and totes are coded with the manufacture date. “A fleet should make sure its drivers, technicians, and other personnel are familiar with how to understand the date code,” Shell’s Jones said. That’s because DEF has a specific shelf life that can be significantly impacted by several factors.

When storing DEF in an environment that is 86°F, useful life is reduced to 12 months. Storing in even hotter temperatures further reduces the useful life. Conversely, storing DEF in temperatures of 50°F or lower can extend useful life to roughly 36 months. When storing at room temperature, or roughly 77°F, shelf life is about 18 months.

For a fleet that is stocking its own DEF, it’s important to think about where and how that DEF is being stored, as well as how long it takes the fleet to consume it. Three years is an unusually long time to stock something as common as DEF. On the other hand, six to 12 months might creep up rather quickly. A fleet should gain an understanding of its DEF consumption rate and adjust its stocking level accordingly.

That said, the manner in which DEF is stored presents the most risk, according to the API’s Harmening. A fleet should have a clear understanding of the ambient temperature of the



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environment the DEF is being stored in. It is never recommended to store DEF outside unless it is in some kind of temperature-controlled container or underground storage tank. Indoor storage at room temperature is typically recommended.

“Most shops I’ve been in are way above room temperature,” Harmening related. “If you’re located in a warmer part of the country where you might be storing DEF in a shop that’s above 95°F, shelf life might be reduced to as little as six months. At that point, the ISO standard recommends that you actually test the DEF before using it. All of this is dependent on high temperatures.”

Sunlight plays a factor, too. When subjected to direct sunlight and/or high temperatures, the water in the DEF can end up evaporating. That causes the urea concentration to increase. It also changes the alkalinity level which is one of the monitored properties of onboard diagnostics. “The DEF could undergo some changes that the OBD might pick up, causing sensors to go off and maybe even forcing an engine into derate mode,” Harmening said.

“If you’re located in a warmer part of the country where you might be storing DEF in a shop that’s above 95°F, shelf life might be reduced to as little as six months.”

Jeffrey Harmening, manager, API

“Essentially, that could require a technician to change out the DEF.”

In addition to storing DEF at the right temperature, it’s also important for fleets to ensure that contaminants can’t enter the DEF supply. Harmening said fleets should use enclosed systems that are reliable such as a quality DEF tote or IBC (intermediate bulk container).

“This becomes very critical because shops tend to be dirty places,” Harmening said. “There are numerous opportunities for dirt and debris to get into the DEF, and one of those 15 important properties is insoluble matter. That’s what can cause problems by clogging the injectors or filters once it gets into the system.”

BlueDEF’s Gagnon said fleets should put standard processes in place to ensure that all dispens-

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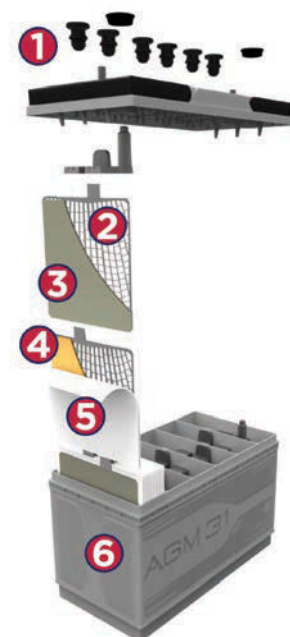
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ing nozzles, tanks, and equipment are kept clean and protected to avoid the infiltration of contaminants. Awareness should also be heightened when filling the DEF tank from a smaller container using a funnel.

“Dirt, grease, or fluids previously poured through that funnel can contaminate the DEF,” Shell’s Jones said. “Additionally, the DEF fill opening should be

kept as clean as possible to prevent possible contamination when a DEF nozzle or funnel is inserted.”

For a fleet that has its drivers refill DEF on the road, control over product quality is somewhat relinquished. But Harmening said there are still some best practices fleets can follow.

“Certain states adopt regulations that require people selling DEF to report the manufacturer and

brand name to the end-user,” Harmening explained. “In addition, sellers may be required to report certain assurances that the DEF meets the ISO 22241 specification. Savvy drivers can always ask the cashier at the gas station for that information if it isn’t printed on the receipt. It’s an even better idea to ask that question before filling up.”

For those drivers who carry DEF with them in the

truck, Harmening said there are also some rules of thumb to follow. First of all, a driver can look for a product with the API stamp of approval. Secondly, look for an expiration date. If one doesn’t exist, look at the traceability code for a date. “That date is usually equivalent to the packaging date,” Harmening pointed out.

Drivers should also be careful about storing a jug of DEF in their trucks. If a truck is parked out in the sun for long periods of time, ambient temperature can climb rapidly and the useful life of the DEF can be reduced considerably, likely down to that six-month mark.

When topping off the DEF tank, Jones said a driver should look for a brown film layer on top of the DEF. That indicates contamination. “Do not start the engine until the tank can be drained and refilled,” Jones warned.

A little more complex practice is the utilization of a refractometer. Designed to measure the concentration of water-soluble fluids, a refractometer can help technicians or drivers check the purity of the DEF they are using.

Regardless of what types of standard processes are put in place to preserve DEF purity, Jones said everything ties back to the overarching best practice. “A commitment to meeting the ISO 22241 standard 100% of the time is very important,” Jones said. ■



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Ins and outs of servicing modern wheel-ends

How to tackle wheel-end issues with more speed and confidence.

By Gregg Wartgow

The laborious process required to remedy wheel-end issues has always been a major challenge for technicians. Fortunately, manufacturers have spent the past few decades making wheel-ends easier to install, inspect, and service. Now technology is making its way to the wheel-end, presenting a potential game-changing advancement for heavy-duty technicians to make those tasks even easier.

“We are putting technology right in the hub so a technician already has a pretty good idea of what they need to do as soon as they walk up to that wheel-end,” said Isaac Otto, digital product manager at ConMet, a manufacturer of wheel-ends, hub assemblies, brake drums, rotors, and other products.

» Understanding the wheel-end system as a whole lends to more complete maintenance.

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Before jumping into the new gadgetry and sensors associated with these improvements, a technician ought to understand the wheel-end system itself. And it's important to recognize this encompasses more than just the wheel.

“A fleet shouldn't view a wheel-end as just a hub, spindle, bearings, and seals,” said Rick Domin, principal training and product support at Timken, a manufacturer of wheel-end accessories including hubcaps, hubodometers, and unitized bearing nut systems. “Tires and brakes are part of the picture, too, because everything works together. Bearings affect the seal and the seal affects the bearings. The entire system affects tire wear.”

And along with the material cost of replacing tires, the impact on uptime and safety must also be considered. When it gets down to it, tackling wheel-end issues using all of the tools at your disposal will ensure success for the entire fleet. But to get it right, you have to ask yourself a few questions.

What type of wheel-end is it?

“Not all wheel-end systems are the same,” said Charles Use, senior product manager at STEMCO, a manufacturer of wheel-end and suspension products. “The number and type of components differ from system to system.”

There are generally two types of wheel-ends: manually adjusted and pre-adjusted. Then there are two types of pre-adjusted wheel-ends: unitized and those that utilize a spacer. This is where technicians can run into problems if they aren't familiar with what they find under the hubcap.

"When you look at either a manually adjusted or pre-adjusted wheel-end, you can't really tell the difference just by the hardware," said Roger Maye, national service manager at ConMet. "When you take the hubcap off, you're going to see a double jam nut or a one-piece spindle nut. Until you get a little further in there to see if it has a bearing spacer, you won't really know what type you're dealing with."

Unitized wheel-ends have their own unique style of hubcap. "Instead of an oil-lubricated wheel-end with a sight glass in the hubcap, it is a solid hubcap with no ability to add lubricant," Maye explained. "Unitized wheel-ends also have some unique mounting hardware."

Once a technician recognizes the type of wheel-end system, they can proceed to the appropriate service procedure. This can also be a challenge if they are not familiar with one style or another.

With manually adjusted versions, Maye said technicians should follow TMC RP 618, which outlines eight steps to manually adjust a wheel bearing to the proper end play of 0.001" to 0.005".

Pre-adjusted wheel-ends are becoming far more common on new vehicles, though. Timken's Domin said the challenge is that some technicians don't know what to do with one. When the first wheel-end service rolls around, they don't recognize what they see.

"Sometimes a technician will just discard what they find and go back to a manual adjust," Domin said. "We're trying to educate technicians and even parts counter staff about the advantages of having a pre-adjusted wheel-end, along with the importance of using proper components."

According to Domin, "proper components" mean high-quality bearings with the proper tolerances for a given application. Proper also means using a reliable spacer on a pre-adjusted wheel-end.

"We don't recommend the reusing of spacers anymore because they are too subjective to inspect them," Domin said. "We just recommend replacing with a new spacer. Considering the cost of a new spacer, it is well worth that insurance. Then you need a good seal with the proper amount of lubricant for that specific wheel-end. We don't care if the technician uses oil or grease, as long as they maintain the proper fill level."

What are the signs and symptoms of an issue?

Faster identification of wheel-end type should result in faster removal and repair. Further downstream in the system, there are things technicians and drivers should be inspecting for that suggest a potential problem in the wheel-end system.

"A technician might see cracks, rust, and corrosion, as well as steel wheels that aren't powdercoated or cured correctly," said David Calzada, a territory manager with IMI Products, a provider of tire, wheel, and fuel-preservation solutions.

"A technician may also encounter wheels that aren't mounted or balanced correctly. The potential consequences range from excessive vibration and tire wear to corrosion-induced wheel failures and even wheel-off incidents."

With driver pre-trip inspections, it's important to always check the level and condition of the lube through the sight glass on the hubcap of an oil-lubricated hub, unless the vehicle has unitized wheel-ends that don't include a sight glass. "You also can't do that on a drive axle," ConMet's Maye pointed out.

"But what the driver or technician can do is look for leaks on the axle flange or around the hubcap," Maye continued. "Look for dark or rusty streaks coming off of the wheel bolts which indicate a loose fastener. You can also look for broken or missing fasteners. Finally, you can look for signs of a seal leak, which is a matter of looking at the back side of the wheel, the brake system, and the tires for evidence of leaking lubricant. Those are the basics on any wheel-end regardless of type."

Vibration and temperature are other symptoms to monitor.

"When the vehicle is in the bay and the wheels are off of the ground, we recommend that the technician rotate the wheels to check for smooth operation free of noise and vibration," Maye said. "The technician can put their hand on the steering knuckle or the brake chamber and check for roughness in the bearings. They can also check for chattering by placing their hand on top of the tire and lifting the wheel assembly with a pry bar to check for loose motion in the wheel bearings. If the technician finds chattering, they can go a little further and check the endplay by physically measuring it."

Another good thing a driver can do is check the operating temperature of the hub after making a long run without significant braking. Maye said they could use an infrared thermometer or simply hold their hand up to the hub.

Nowadays, technology is helping perform these types of tasks via sensors in the hub without the driver or technician even knowing that it's happening. More on that later.

What about preventive maintenance?

As STEMCO's Use pointed out, even if wheel-end components are more maintenance-friendly, they should not be considered maintenance-free. "TMC RP 631C outlines best maintenance practices," Use said.

When performing any wheel-end maintenance, Use said hubs should be thoroughly cleaned and inspected for thread stretch, antilock brake exciter/tone ring damage, and properly sealed bearing cups. "Axles should also be inspected for spindle seal shoulder wear and bearing radius wear that is deforming the seal shoulder," Use added. "Thread, keyway, or D-flat damage are also commonly observed. Finally, the bearing journals should be examined for excessive wear."

To help ensure that seals do not fail, it's beneficial to use a proper installation tool and follow the manufacturer's recommended installation



» STEMCO says its Trifecta pre-adjusted hub assembly provides a quick, easy installation with a simple torque-down procedure and no additional bearing adjustment. Trifecta also features a unique seal and hubcap to improve wheel-end performance and life.

STEMCO

"A technician might see cracks, rust, and corrosion, as well as steel wheels that aren't powdercoated or cured correctly."

David Calzada, territory manager, IMI Products

procedure for that specific seal. The spindle shoulder and hub bore must be properly cleaned, as well.

Air disc brakes are another area for consideration.

"While the main components of a wheel-end system for non-driven axles are the hub, bearings, hub seal, spindle

» IMI Equal FLEXX is an internal wheel-end balancing solution. The soft, dry particles absorb the energy created when a tire vibrates, thus reducing tire vibration at the wheel-end.

IMI Products





» ConMet's SmartHub telematics technology starts with a wireless sensor mounted to the barrel of the hub right above the outer bearings. That sensor measures both the temperature of the hub and the vibration signatures coming off of the hub.

ConMet



nut, and hubcap, many people also refer to the drum or air disc brake system as part of the wheel-end," said Mark Holley, director of marketing and customer solutions for wheel-end at Bendix Commercial Vehicle Systems, a developer of active safety technologies, air brake charging, and control systems for commercial trucks.

As Holley pointed out, a common problem with a wheel-end is hub seal failure. If a seal fails and the level or quality of lubrication degrades, the bearings may be severely impacted by the increased friction and heat.

"Bearing failure leads to increased vibration in the wheel-end which can negatively impact brake system components," Holley added. "Additionally, if the sealing components are damaged, wheel seal lubricant can

"If the sealing components are damaged, wheel seal lubricant can splash onto the brake friction which can impact braking performance."

Mark Holley, director of marketing and customer solutions, Bendix

splash onto the brake friction which can impact braking performance. In a worst-case scenario, bearing failures can lead to wheel-off situations."

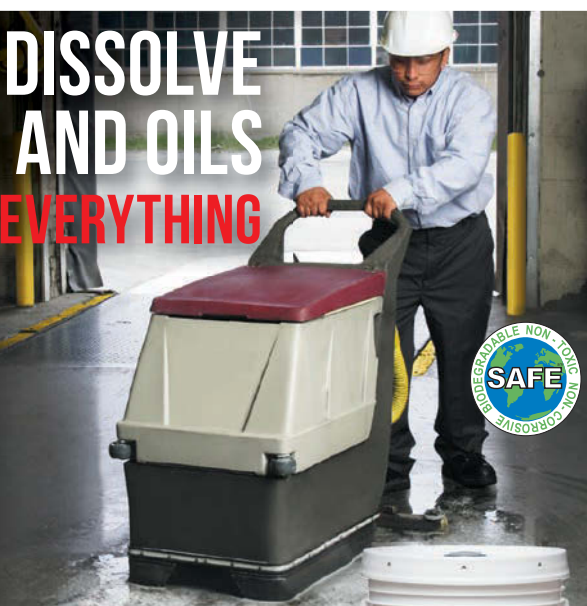
"As air disk brakes become more widely utilized, it is imperative to select a high temperature-rated seal that can withstand the additional heat created during braking," STEMCO's Use concurred. Examples of such seals are STEMCO's Discover and Guardian HP.

With respect to the bearings, Use said failure is most frequently caused by either a lack of lubrication or over-torquing. "Bearings must always be lubricated prior to torquing," Use explained. "Additionally, if a bearing has been dropped onto the ground prior to installation, it should be discarded due to potential damage to the cage."

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When it comes to fasteners, Use said technicians should always follow the manufacturer's recommended installation procedures because there is such a wide variety available. Technicians can also consult TMC RP 618B.

A proper hubcap also plays a role in wheel-end longevity. "Fleets should make sure they are properly vented," Use said. It's also important to select the right material composition to help resist corrosion. "Depending on a fleet's area of operation and weather environment, composite materials may be a better selection than metals," Use added.

Finally, selecting the right lubricant for the application is critical.

"Choosing a lubricant that maintains its chemical properties at your operating temperatures ensures long life of the wheel-end," Use said. "Getting the proper level of lubricant in your wheel-end is also important. TMC RP 631C is your definitive guide to best lubrication practices. When using a semi-fluid lubricant, it is imperative that the hub cavity be filled to 50%. You can utilize a fill template to simplify this process."

Tools and technology help monitor wheel-ends

According to Timken's Domin, it is hard to just generally say wheel-ends should be inspected every 30,000 or 50,000 miles, for example. Some fleets inspect them every time a vehicle comes in for a PM. The challenge is that PM intervals, in many cases, have been extended significantly due to longer oil drain intervals. A technician could use some assistance in alerting them to a potential wheel-end issue that needs to be investigated.

Timken added a new product a couple of years ago to help. Hot Dots are little sticker-like objects that adhere directly to the wheel hub or hubcap. The white circle in the center will turn black when wheel-end temperature exceeds 250°F. "That could be due to a lack of lube, a bearing issue, or even an issue with the brakes," Domin pointed out. "Regardless, that wheel-end got really hot and should be inspected."

Taking things one technological step further, a telematics sensor can actually monitor hub temperature while the vehicle is in operation. It can also monitor vibration. "This is the next step in the wheel-end evolution that goes beyond what pre-trip and PM inspections can cover," ConMet's Maye said.

ConMet's PreSet Plus SmartHub is an emerging telematics technology that algorithmically process-

es data captured from the wheel-end. SmartHub starts with a wireless sensor mounted to the barrel of the hub right above the outer bearings.

"That sensor measures both the temperature of the hub and the vibration signatures coming off of the hub," ConMet's Otto said. Backend algorithms analyze the temperature and vibration data. "SmartHub will determine when an abnor-

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mal behavior is happening and what the potential failure modes could be," Otto added. SmartHub even directs the technician to the wheel position where the issue is occurring.

With respect to the bearings, for example, vibration patterns might increase over time when a bearing becomes fatigue-spalled. This data could help a fleet take proactive action and inspect the hub before a failure occurs.

Otto said he has also been pleasantly surprised to find that SmartHub can help detect not only issues inside the hub, but also issues with other hub-connected components such as tires and braking systems.

"For example, there are different vibration signatures for different types of tire wear," Otto explained. "Another example is a stuck brake caliper that is heating up the hub. When you look at the hub temperature and vibration data relative to braking data, you can start to pinpoint issues like this. All of this helps fleets make better maintenance decisions based on what is actually happening with a vehicle, as opposed to just mileage intervals."



Another tool is Bendix's air disc brake wear sensing technology that determines when a pad is nearing its replacement period. The sensor provides a signal via telematics that fleets can use to proactively schedule maintenance before a more costly braking system component failure occurs.

» The AirBoxOne trailer telematics solution from Dröv Technologies integrates with several wheel sensors, including the SKF Wheel-end Monitor that monitors wheel-end vibration and temperature (pictured here at top of wheel).

Dröv Technologies

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Fleets shouldn't forget about the eight opportunities for wheel-end issues trailers haul to the table.

Dröv Technologies offers multiple wheel sensors that integrate on its AirBoxOne telematics solution for trailers. These sensors can help catch a variety of issues that could point to a wheel-end problem.

The SKF Wheel-end Monitor installs on the lug nuts of each wheel-end and communicates wirelessly via Bluetooth. "This sensor measures temperature of the hub," said Pete Jankowski, chief technology officer at Dröv Technologies. "Overheating could be the result of a hub bearing that lacks lubrication, brakes overheating, or other hub bearing-related issues. The SKF sensor also monitors vibration at the wheel-end, which can indicate potential issues with the hub such as loose lug nuts or studs, an over-torqued or loose axle nut, or even the potential wheel separation from a failing hub."

An AirBoxOne TPMS Sensor has two installation options: externally to the Schrader valve of the tire or internally on the rim. Regardless, this sensor can help the fleet pinpoint other wheel-end-related issues. "Besides monitoring tire pressure, TPMS sensors can measure the air temperature inside the tire," Jankowski explained. "High temperature can indicate potential problems with the hubs, imbalanced brakes, and tire alignment."

AirBoxOne also offers wheel-end sensors that monitor brake-related behaviors. This data helps fleets catch things like pad wear, brake dragging, and air pressure.

Final thoughts

Whether you're talking about a trailer or a tractor, today's world of extended PM cycles is putting more pressure on drivers with respect to pre-trip inspections. ConMet's Maye said having the ability to digitally monitor wheel-ends is more important than ever.

"A driver can't see what's going on inside of that wheel-end," Maye said. "Thanks to technology, now these wheel-

ends can be inspected in real time while traveling down the road."

Beyond hub temperature and vibration, ConMet has a suite of new products and services that monitor things like tire pressure, axle load, and trailer line pressure. Others in the pipeline will help monitor things like lube quality and stud tension.

"All of these things are important to the health of the wheel-end," ConMet's Otto said. "This is where things can get really interesting where we can do more with our algorithms in the background to really pinpoint the real issues. Then a fleet can move more toward a predictive state of wheel-end maintenance." ▀

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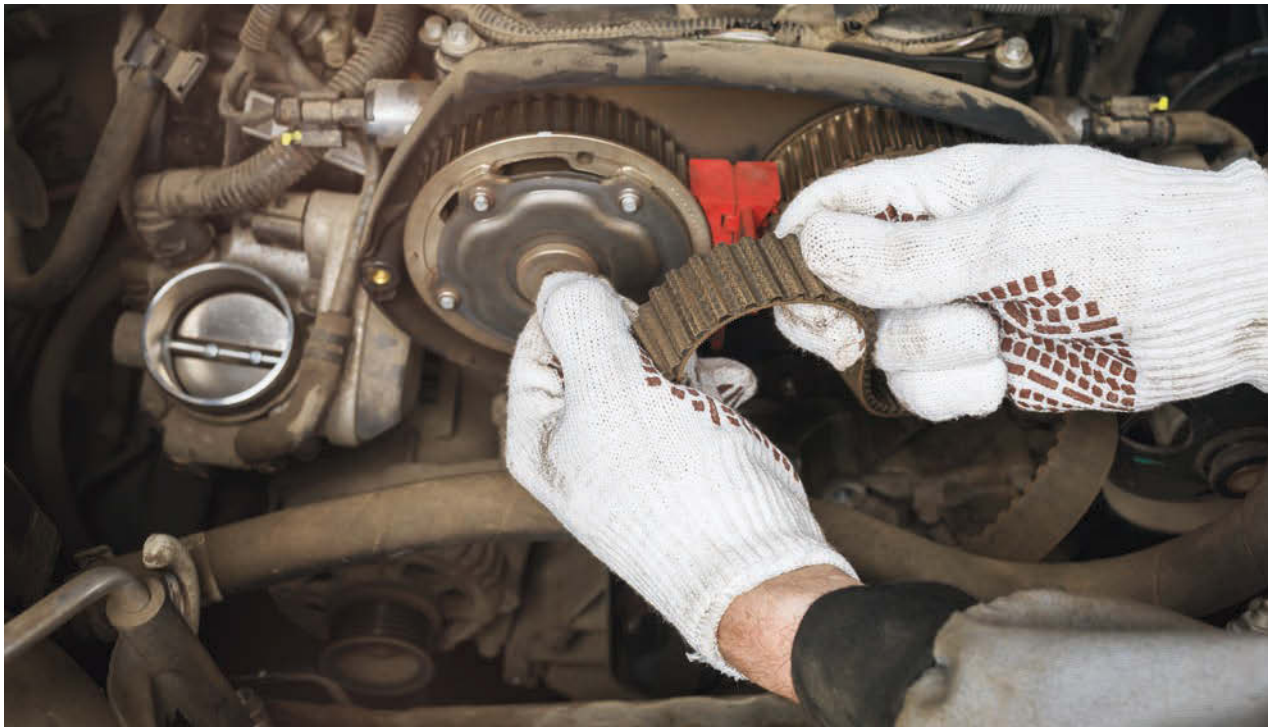
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Overlooking the point of PM inspections

An untrained tech might not see the true goal of an inspection.

In my first autonomous maintenance assignment in the 1970s, my engineer boss told me if I saw any problems, especially if something was unusually hot, I should come and get him. He never defined what a “problem” was nor did he give me any way to determine what was “hot.”

The problem was that I was an inexperienced oiler aboard the converted T2 Tanker, with only four weeks of service aboard any vessel at that point. And this ship was quite old, a Korean War relic, in fact. Every component looked messed up and radiated heat. To me, they all teetered on the edge of failure. Bothering the engineer didn’t seem practical every 15 minutes.

I was ignorant. I did not know what I was looking at and didn’t even know what it did. My 18-year-old mind’s solution was to concentrate

on more important things, such as my tan (when I had free time).

It was okay to show me how to grease something, but not okay to ask me to inspect it, especially if missing something led to dire consequences. Ultimate responsibility for any potential catastrophic failures would rest with the engineer, but the experience would have also ruined my taste for maintenance in general.

Do we have the same problem in the bay with preventive maintenance? We might, if the technician inspecting a unit or system does not have the sufficient training and experience to know what they are looking at.

Recently, I took my car into the dealer for some work. They came back with a \$2,000-\$3,000 quote to replace the engine mounts. I was suspicious because the car was relatively new (but out of warranty). I took the car to my long-time trusted mechanic for a second opinion. After an inspection by the experienced technician, he explained that while he could see their perspective, he could also see where a miniscule oil leak was dripping on the engine mount and that was an easier fix.

Another problem area is dealing with your typical fleet check sheet. Check sheets don’t help. The reason is that they are designed for industry veterans with decades of experience. They are “implicit tasking,” where the detailed knowledge is in the inspector’s brain. A bit more explicit direction would be more impactful for typical mechanics.

Task list check sheet activities include:

- ➔ Checking the belts

» Explicit direction in a PM checklist is more impactful for inexperienced technicians.

227692944 | Sergei Chaiko | Dreamstime

- ➔ Checking the connection
- ➔ Checking operation

These are widespread and useful tasks on a PM task list, but in too many cases don’t get the job done.

This is because it takes the person performing the PM many months or even years to see each and every failure mode of the various belts, connections, and assets overall that are brought in. But we often ask someone with an unknown experience level to inspect for something they may or may not have seen before.

This can be an easy fix simply by adjusting the verbiage. I suggest everyone review their task lists for qualifiers that even an untrained eye can spot:

- ➔ Check belt tension
- ➔ Check belts for cracks, chewed-up edges, etc.
- ➔ Check the connection for tightness by loosening the nut and retightening hand-tight
- ➔ Check the connection for corrosion (visually). If corroded, disassemble, remove corrosion
- ➔ Check for smooth operation, note unusual noises, vibrations, etc.

These qualifiers help to direct inspectors to specific, actionable things, reminding the inspector of the common failure modes. You might even ask the senior techs what they look for (listen for, feel for, smell, etc.). Of course, a nearby picture book with photographs of failure modes would also make for an excellent visual aid. With smart phones being everywhere, encourage everyone to photograph any unusual wear, deterioration, defect, damage, and of course, failure modes. Accumulate these photographs in an album for everyone to review (especially the newbies).

The main goal is to get technicians to “look” for problems, not just “see” if they can find one, as my first boss had advised. And despite what the dictionary says, looking and seeing aren’t the same.

See: To perceive with the eyes; look at.

Look: To ascertain using one’s eyes.

If you go back to their origins in Old English, you can notice where they differ.

See: Old English *seon* “to see, look, behold; observe, perceive, understand; experience, visit, inspect.”

Look: Old English *locian* “use the eyes for seeing, gaze, behold, spy.”

So, in truth, we want the inspector to do both: See—observe, perceive, understand—the equipment; as well as know what to look for (gaze, behold, spy).

In essence, we ought to start teaching the art of seeing. Or, more specifically, the art of seeing with one’s mind open. Ask questions like, “Does anything look out of place, or look ‘bad?’” A few more include: What would cause that condition? Will this lead to failure (and how severe)? How could we avoid this problem?

Being able to see develops slowly. Anything you can do to speed it up will pay dividends in avoided failures and more stable operation. ■



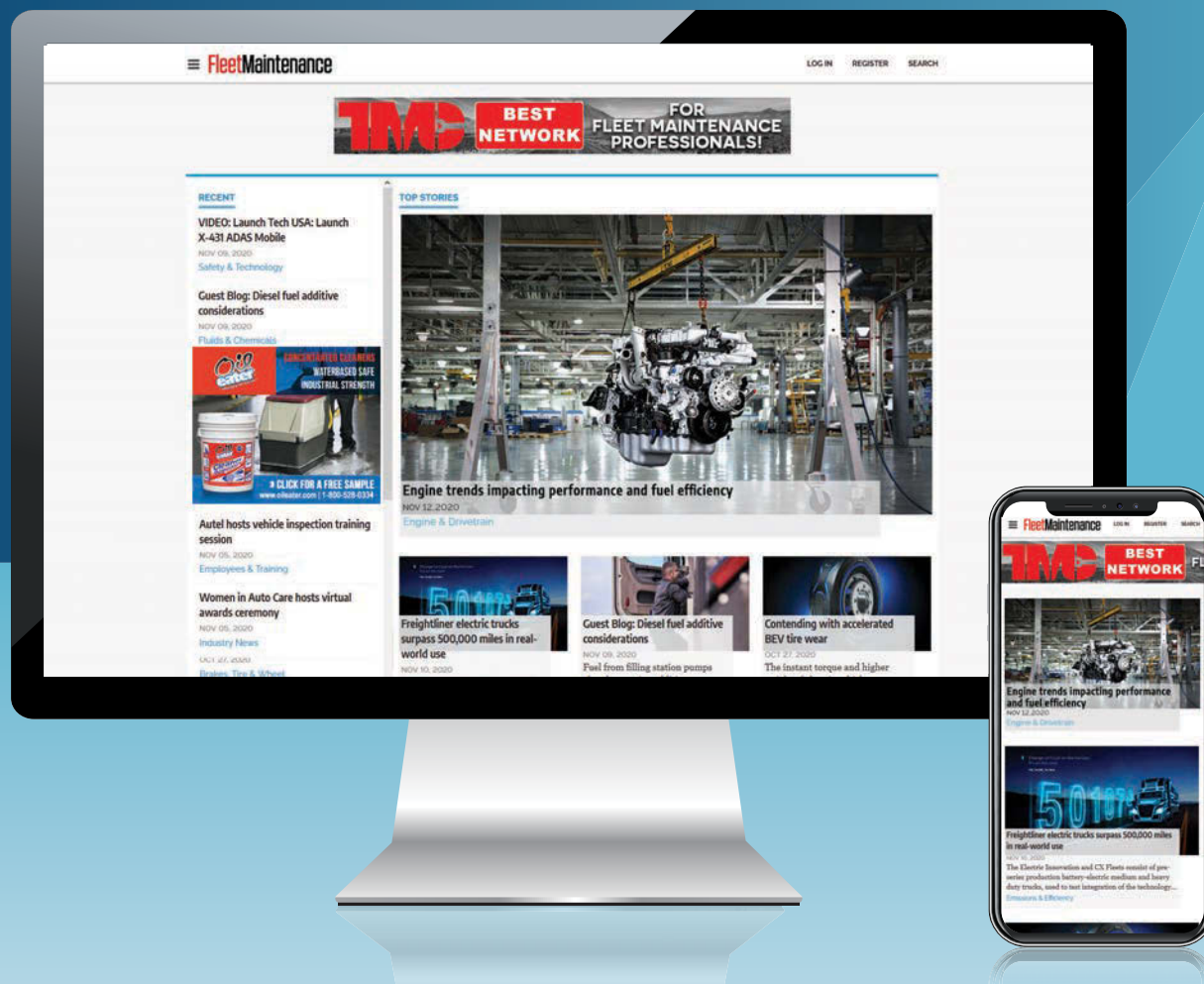
By Joel Levitt

PRESIDENT, SPRINGFIELD RESOURCES

Joel Levitt is the president of Springfield Resources, a management consulting firm that services a variety of clients on a wide range of maintenance issues. Levitt has trained more than 17,000 maintenance leaders from more than 3,000 organizations in 38 countries. He is also the creator of Laser-Focused Training, a flexible training program that provides specific, targeted training on your schedule, online to one to 250 people in maintenance management, asset management, and reliability.

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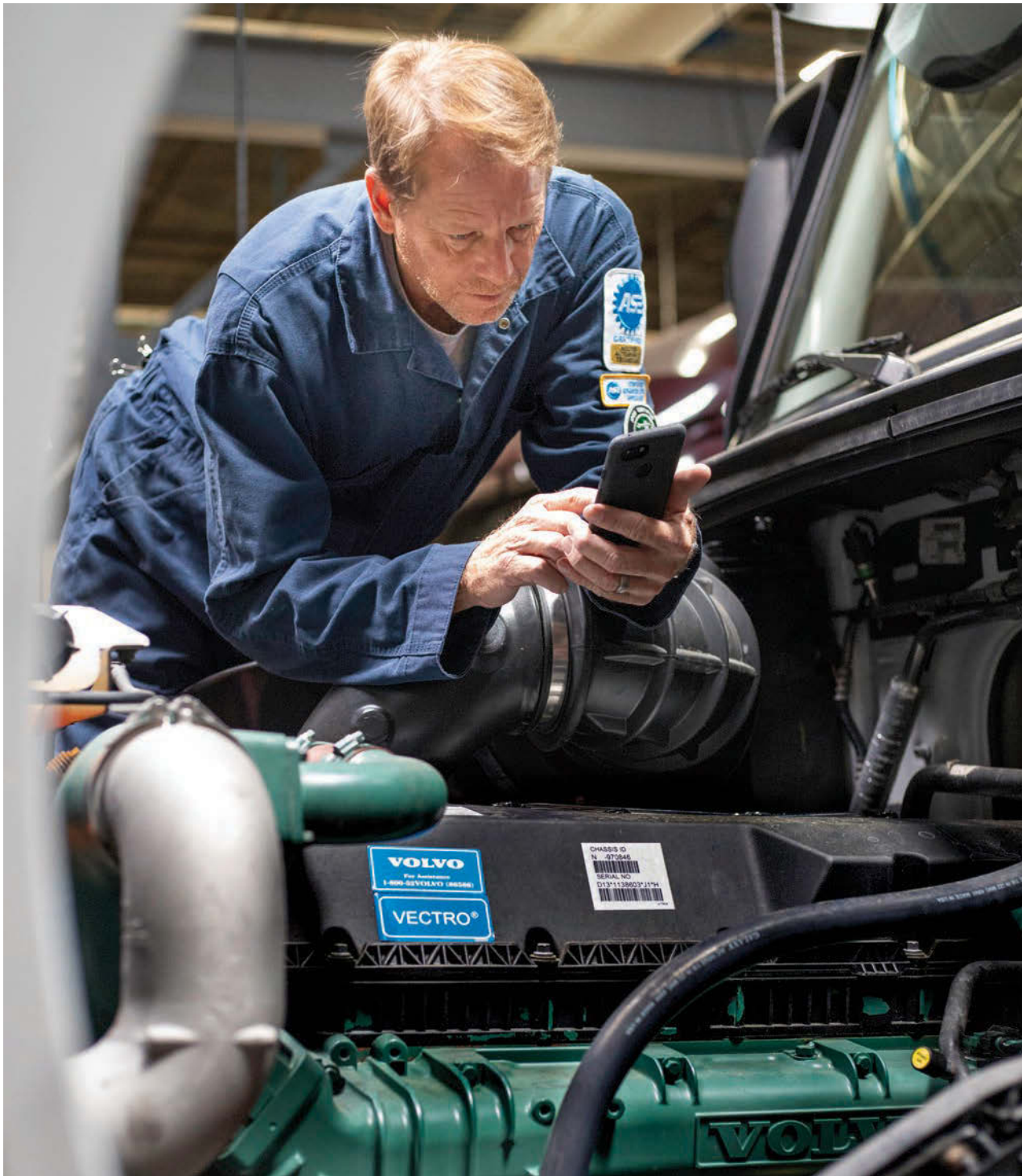


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Increase in electronics drives need for diagnostic tools

Diagnostic tools have become essential to maintenance.

By Mindy Long

The amount of time diesel technicians spend on electronic diagnostics has grown as the number of electronics on Class 8 trucks has increased, and technicians are turning to diagnostic tools to help streamline repairs and increase efficiency within the shop.

“Everything is going electronic and digital. Electronic control modules and electronic control units are showing up everywhere,” said Bruno Gattamorta, vice president of sales and marketing, Cojali USA Inc., which manufactures the Jaltest Diagnostics tool.

» Diagnostic tools have become essential in order to maintain today’s vehicles.

Noregon

“Diagnostic tools that show pending faults allow proactive repairs to be made, so issues don’t arise when the truck is on the road.”

Jason Hedman,
product manager, Noregon

“Everything is going to be electronic in a certain element.”

Jason Hedman, product manager at Noregon, a diagnostic repair and data analytic solutions provider, said that on average, trucks manufactured in 2000 contained fewer than three ECUs connected to a vehicle network. Today, the average new truck contains 21 or more.

“This major uptick in ECU count opens the door for more electronic and communication errors, signifying the importance for technicians to be proficient on tools and applications that help them diagnose, troubleshoot, and repair electronic issues,” Hedman said.

The use of electronic sensors has not only grown exponentially, but will continue to increase, said Thomas Kotenko, a general manager for NEXIQ Technologies. “You, in essence, have a moving computer. Everything is signaled through electronics,” he said. “Now, a technician isn’t working on an engine; he is working on a computer.”

Allison Whitney, a spokesperson for Autel, a developer of intelligent diagnostics, detection, and analysis systems, said scan tools have become essential to repairing and servicing vehicles as electronic sensors and components manage multiple systems within the truck.

“Most shops will perform a quick triage-like scan as soon as the vehicle enters the bay door and before the hood is popped, just to get a quick idea of the extent of the issues they are dealing with. Without a diagnostic tool, it’s a total guessing game, and techs would need to swap out parts in the hope that they are replacing the right one,” she said.

What’s more, Gattamorta said fixing electronic issues is more complicated than replacing a component that failed. “When you look at wires, there are probably 100 yards in Class 8 trucks,” he said. “You have to start navigating the wire. Is there interference? Is it a short circuit? Wiring is set up in blocks so you can segment by areas, but as you can imagine, you still have to go in with a detective cap and figure out where the cable went wrong.”

That is why wiring diagrams can be so helpful, but an OEM wiring diagram could take up a whole wall in a conference room, Gattamorta said. The Jaltest Diagnostics tool has a wiring diagram for the entire truck. "It shows you how everything connects to each other and how you go from system A to system B. You can see the wiring diagram, see the cables, and how they're connected to the pins," he said, adding the information can simplify repairs.

Hedman said trucks have become too complex to simply rely on a code reader and a wrench to diagnose and repair an issue. Today's technicians must be proficient in multimeters, refractometers, and other handheld tools, he said.

"Consider the rise in pending faults since the advent of EPA 10 engines. Technicians can't rely on dash lamps and active fault codes if they expect to dispatch a healthy truck. Diagnostic tools that show pending faults allow proactive repairs to be made, so issues don't arise when the truck is on the road," Hedman said.

With Noregon's JPRO's Data Monitor, technicians can chart data points across multiple ECUs to help discover wiring or communication issues. "This helps technicians discover the general area of a communication failure and use a wiggle test, multimeter, or other method to pinpoint the exact wire or sensor causing the issue," Hedman said.

Increased use of electronics is also placing a more significant strain on batteries, and Whitney said battery analysis tools have become necessary as the modern vehicle evolves. "Just consider how much is expected of the vehicle battery with systems such as stop/start ignitions and the expansive safety and infotainment systems," she said.

Autel's line of starting and charging analysis tools helps technicians analyze the three components that comprise the starting and charging system—the battery, the starter, and the alternator—giving a clear and concise analysis of each system along the way, Whitney said. The MS909CV now comes with a battery analyzer accessory tool so new tests can be performed wirelessly through the tablet tool. Technicians can test the battery or electrical system components individually.

Duane Watson, technical trainer for Bosch Aftermarket Service Solutions, said knowing the battery voltage is as important as reading codes at the time of vehicle diagnosis. Bosch has built a voltage gauge in its OBD-II diagnostic tool on all of its ADS scan tools. "These scan tools can be paired with a BAT 120 battery tester. It allows the scan tool to be a full-blown battery tester and electrical system diagnostic tool," he said.

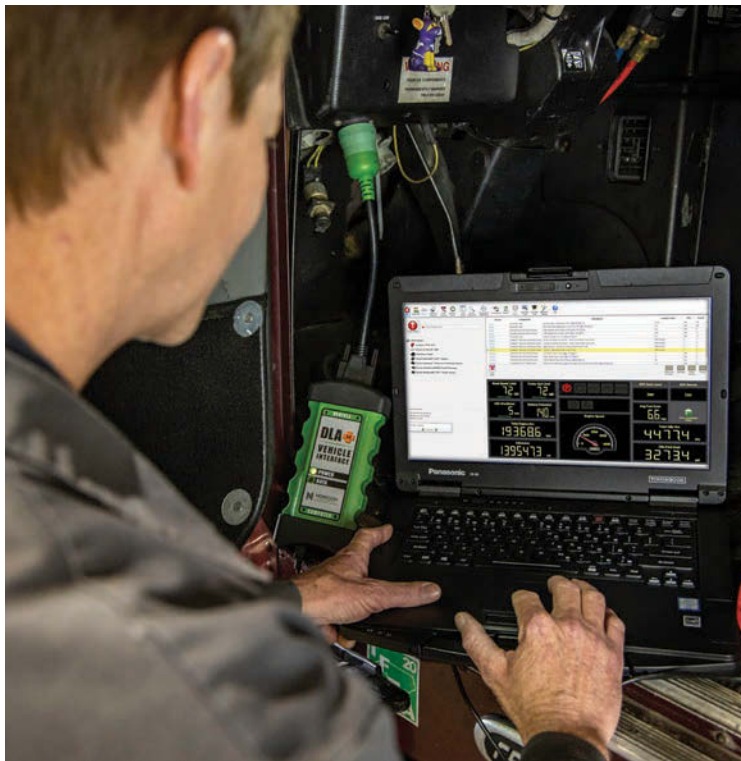
Hedman said many technicians are visual learners, so the JPRO tool interface presents graphics

that are easy to understand. "For example, the visual display during a battery diagnosis in JPRO contains a large graphic consisting of key data points in their respective areas, helping technicians quickly learn which items are out of range," Hedman said.

Whitney said that scan tools themselves have advanced significantly as equipment technology has advanced. "Our tools show freeze frame data for each of the codes that can show the technician what was happening prior to the code be setting off," Whitney said. "The ability to perform active tests on components is another vital feature."

Advanced tools translate into improved diagnostics. "As technicians like to say, codes tell on one another, and often one code begets another, and the tech needs to go deep and find what is the root of the initial and subsequent codes," Whitney said. "That's where the active component testing becomes an essential feature of a good diagnostic tool."

One of the trucking industry's greatest challenges is the technician shortage, so shops need to maximize technicians' time, Kottenko said. "Rather than using the old school method of obtaining a trouble code, technicians can use a scan to be more efficient," he said. "The time savings would at least be one- to 10-fold."



» JPRO's Data Monitor charts data points across multiple ECUs to help discover wiring or communication issues.

Noregon

Technicians simply can't compete with the efficiency of a diagnostic tool when trying to repair electronic issues, Hedman said, and tools help technicians find the exact location of a failure, resulting in a much more streamlined process.

Gattamorta said diagnostic tools can guide diesel techs through the repair, which can be helpful for techs not familiar with a particular piece of equipment and can speed repairs for even seasoned technicians. ■


“Rather than using the old school method of obtaining a trouble code, technicians can use a scan to be more efficient.”

Thomas Kottenko, a general manager for NEXIQ Technologies

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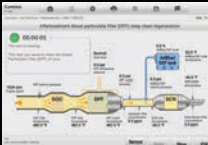


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Inside the ASE test development process

The National Institute for Automotive Service Excellence has 57 different tests. Here's how they are developed.

Since 1972, the National Institute for Automotive Service Excellence, or ASE, has been working to improve the quality of vehicle repair and service by testing and certifying medium/heavy-duty truck professionals. ASE has become known as the pre-eminent independent non-profit organization working to uphold and promote high standards of vehicle service and repair.

Today, more than a quarter of a million individuals who currently hold ASE certifications work in every segment of the transportation industry, from automobile and medium/heavy-duty truck to transit and school bus, collision repair, parts, military, and more. The path to ASE certification begins with one or more of 57 different tests. After passing at least one exam and providing proof of two years of relevant work experience, the individual

becomes ASE Certified. To remain certified, the professional must be retested every five years.

The tests are no cinch to pass; in fact, usually only two out of every three test takers pass on their first attempt. The exams stress knowledge of real-world job-related skills with each test question developed through a strict writing and validating process. ASE test questions are written in workshops by experts in the subject matter of each specific test. The test development teams represent a national cross-section of the motor vehicle service industry, including current technicians, training reps from auto and truck manufacturers and aftermarket companies, customer service professionals, and educators.

The following is a step-by-step look at exactly how the ASE tests are developed.

- Test questions are developed at test-writing workshops, which typically include 10-20 working service professionals. Separate workshops are conducted for each ASE certification test.
- At each workshop, the participants review and modify the list of tasks needed to successfully perform each particular job category (such as suspension and steering systems).
- Questions are then written by the industry experts to correspond to these job tasks. The diagnostic and repair scenarios are updated to reflect the most current and relevant

» ASE certification exams stress real-world job-related skills with questions developed through a strict validation process.

National Institute for Automotive Service Excellence

technology and systems. This ensures that all test questions focus on need-to-know topics.

- Trick questions and manufacturer-specific questions are not acceptable. Each question is reviewed by the entire workshop for clarity and technical accuracy to ensure there is only one right answer and three incorrect answers.
- Questions that are accepted by the panel are included as non-scored pre-test questions and placed in live ASE tests to gauge performance. Since test-takers do not know which questions count, they do their best to answer every question correctly, and accurate statistics are collected.
- Based on how well a question performs in pre-test, it may become a live test question or be reconsidered in a future workshop. Only those questions with an appropriate level of difficulty and strong ability to identify more-knowledgeable technicians make the cut. At this point, every question used for score in an ASE test has been written and approved by a panel of industry experts and validated by hundreds or thousands of working technicians.
- Even after a question passes pre-testing, ASE continues to monitor it. Each question is tracked for proper performance every time it is used in a test.
- When a question becomes technically outdated, it is removed from the pool of live test questions.

Questions that are accepted by the panel are included as non-scored pre-test questions and placed in live ASE tests to gauge performance.

Most technicians and fleet shop owners would agree that each year, trucks are getting more complex and that repair technology and diagnostic tools are constantly changing. While this presents a challenge to the truck service and repair industry, it also presents a challenge to fleet management searching for competent and knowledgeable professionals to care for their vehicle fleet. By virtue of ASE's unique and rigorous test development process, technicians can trust that the ASE tests fairly assess their knowledge, and employers and fleet owners can be assured that ASE Certified medium/heavy-duty truck technicians are up to the task. ■



By George Arrants

VICE PRESIDENT, ASE EDUCATION FOUNDATION

George Arrants is the vice president for ASE Education Foundation. Arrants works with instructors and administrators to develop partnerships with local businesses and industries through program advisory committees. He is the past chair of the Technology and Maintenance Council's TMC SuperTech, the National Technician Skills Competition, and TMC FutureTech, the National Student Technician Competition. His entire career has been in the automotive service and education industries.



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➔ For more information visit FleetMaintenance.com/21223488



» Applications include IC 2015-05, IC Corporation 2019-03, International 2019-02

The **Air Brake Pressure Switch**, No. 904-7791, from **Dorman Products** is designed to match the fit and function of the original part on specified vehicles. Made of quality materials, it is engineered for reliable performance and durability and to serve as a replacement for an original part that has failed due to wear, damage, and corrosion. Applications include IC 2015-05, IC Corporation 2019-03, and International 2019-02.

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» For use in dry van, reefer, and shipping container applications

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» Improves low-temperature performance

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Link Mfg. ROI Auxiliary Suspension Systems include self-steer and non-steer auxiliary suspensions. The 8K, 10K, 13.5K, and 20K ROI Auxiliary Suspensions Systems are expected to be commercially available in 2022. The suspensions will sense and maintain optimal tire-to-ground pressure, reducing tire wear and maximizing fuel mileage, as well as automatically respond to the vehicle's wheel traction, removing the need to be manually retracted. In challenging conditions, the ROI technology and the vehicle's ABS will sense the absence of surface friction and reduce pressure as needed to shift the requisite tractive force to the drive axles.

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TOOLS & EQUIPMENT

A roundup of the latest tool and equipment offerings.



» Adds coverage on material handling equipment

The **Cojali Jaltest Software 21.2 Update** extends its coverage and actions on material handling equipment, offering a module called Jaltest MHE. Machines such as forklifts, boom lifts, scissor lifts, telescopic handlers, etc., are also available through Jaltest MHE. The 21.2 update also extends the wiring diagrams available to more than electronically controlled systems. The user can now find full vehicle wiring, regardless of if it's ECU controlled or not, without having to exit the diagnostics software. In addition, Jaltest now provides in-app access to FCA-protected vehicles equipped with the SGW module.

➔ For more information visit FleetMaintenance.com/21229404



» Ideal for tight spaces

The **VIM Tools Heavy Duty 90T Ratchets**, Nos. HDR410, HDR614, and HDR818, feature a 90-tooth reversible gear head that requires only 4 degrees of sweep, making them ideal for tight spaces and jobs needing accurate movement. According to the company, the ratchets meet 200% ANSI torque specifications. They have an ergonomic handle and the ratchet head can be serviced quickly and easily. The ratchets are available in 1/4" drive (No. HDR410), 3/8" drive (No. HDR614), and 1/2" drive (No. HDR818).

➔ For more information visit FleetMaintenance.com/21230955



» Features two full-length deep drawers

The **Matco Tools 2S Double Bay 25" Toolbox** is an ideal entry-level line of tool storage for students and new technicians. Notable features include a power drawer with 110V and USB power, two full-length deep drawers to store larger sockets and socket sets, kickplate for durability, and aluminum overwrapped handles that protect against damage. Built with a unibody construction, the T-shaped center shelf and inner walls are fully-welded at all connection points to ensure the toolbox is sturdy, stable, and secure. The 2S is available in five colors: red, white, black, gray, and blue. Additional storage can be added with a 2S hutch.

➔ For more information visit FleetMaintenance.com/21229407

» Built-in micro-USB port for charging

The **Coast SPG400 Safety Glasses with Inspection Beam** are designed to shine a light to keep the user's hands free, keeping them safe and to reveal critical elements. The built-in rechargeable LED improves near-range and medium-range viewing for up to 9.5 hours on a single charge (charging cable included). Rugged but refined, these ANSI impact-tested safety glasses are built to last, featuring premium anti-scratch and anti-fog clear lenses. Padding on the nose and temple pieces ensures comfort for long days and a snug, secure fit for high-intensity, active work. The included soft pouch provides an easy solution for protecting the glasses and lenses while not in use.

➔ For more information visit FleetMaintenance.com/21229398



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» For more information visit FleetMaintenance.com/21229412



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The **ATD Tools 20-pc 1/4\"/>**

» For more information visit FleetMaintenance.com/21236386



» Fits in hard-to-reach areas

The **Lisle Corporation 45 Degree Disconnect Pliers**, No. 37140, features a low-profile design with a 45-degree bend to disconnect fuel lines, EVAP line fittings, and DEF fittings in hard-to-reach areas. The tool is able to fit between the top of the fuel tank and vehicle. It's ideal to work on Delphi two tab connectors and some import vehicles. It can also be used on some electrical connectors.

» For more information visit FleetMaintenance.com/21221580

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For more information visit FleetMaintenance.com/21230637

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The **Fenix Lighting HM65R Rechargeable Headlamp** features both an independently controlled spotlight and floodlight for a combined maximum 1,400 lm of neutral and white light. Powered by the included 3,500mAh battery, the headlamp is USB-C rechargeable and includes a battery level indicator. It's made of a magnesium alloy for strength and is impact resistant to 6.6', with less weight. Additionally, it's dust-proof and waterproof to 6.6'.



For more information visit FleetMaintenance.com/21231821



Magnetic base enables handsfree use

The **Milwaukee Tool Rechargeable 500L Everyday Carry Flashlight with Magnet**, No. 2011R, delivers up to 500 lm of TRUEVIEW high definition output and is designed to provide the ability for users to use in hand or work handsfree. The magnetic base allows users to quickly switch from handheld use to handsfree, while a reversible clip makes it easy to attach to the brim of a hat or pocket. The flashlight has three output modes, including high, medium, and a low mode, and comes with USB charging and an on-board battery indicator. Additionally, it's designed with Bulls-Eye Beam Pattern to provide optimized distance and up-close illumination.

For more information visit FleetMaintenance.com/21230640

Two runway length models

The **Hunter Engineering Heavy Duty Pit Racks**, Nos. P490HD and P491HD, are designed to offer easy installation for the shop owner and



easy access for the technicians. The P490HD provides maximum flexibility by accommodating a wide variety of vehicles. Its compact 226" runway allows for any number of rear axles on the concrete apron, with the only size constraint being whatever will fit in the shop. The P491HD features a 360" runway for longer-cab vehicles, with rear-axle adjustments performed on slip plates. Both models can accommodate 35,000 lbs., with 30" wide runways and built-in slip plates and turnplates.

For more information visit FleetMaintenance.com/21236019

Can attach to a 1/2" impact wrench

The **AME International Hub Buddy Truck**, No. 37500, is designed to effectively clean the wheel hub thoroughly and quickly for heavy-duty truck applications. The cleaner is easy to use and can attach directly to a 1/2" impact wrench. The Hub Buddy Truck saves technicians on time and is ideal for using before refitting wheels.



For more information visit FleetMaintenance.com/21237674

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PS Form 3526-R, July 2014

» Extends TPMS functions on X-431 scan tools

The **Launch Tech X-431 TSGUN** is designed to work with X-431 scan tools to expand TPMS functions and generate revenue for X-431 users. It can instantly read tire pressure, tire temperature, and battery status. The X-431 TSGUN is able to activate and match all 315MHz or 433MHz sensors as well as read, copy, and write the sensor ID quickly and easily. Users can also reprogram Launch sensors unlimitedly with a built-in tire pressure learning instruction.

For more information visit FleetMaintenance.com/21234688



» Designed with an all-metal frame

The **Graco LDX, SDX, and XDX Hose Reels** are designed for a smoother release and consistent recoiling with less maintenance. The hose reels can handle all common fluids and include an all-metal frame. The LDX offers value for smaller garages, independent repair facilities, and industrial manufacturing environments. The SDX is more ideal for applications requiring more frequent use such as car dealerships, light- to medium-duty truck dealers, and fleet maintenance facilities. The XDX hose reels are sealed and suitable for extreme heavy-duty use in any indoor or outdoor environment, such as for mining maintenance facilities, lube trucks, and heavy-duty equipment dealers applications.

For more information visit FleetMaintenance.com/21238555



» Has a 4mm diameter camera probe

The **Oasis Scientific Vividia USB/Wi-Fi Rigid 2-Way Articulating Borescope Videoscopes**, Nos. W2430 and W2460, are rigid borescopes with a pivoting probe head. The camera probe is small at 4mm (0.157") diameter and can be turned in two directions with a maximum bending angle in each direction to more than 180 degrees. The total rigid probe tube length for W2430 is 16" and 28" for W2460. The built-in Wi-Fi and USB connection is compatible with iPhones, iPads, Android devices, and Windows PC.

For more information visit FleetMaintenance.com/21238557



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» When it comes to changing the culture, it is important to have buy-in from the technicians.

Transervice

Six steps to achieve zero shop accidents

Steps taken by a Puerto Rican maintenance facility to improve its safety metrics.

No matter the fleet, there is always room for improvement. And there are steps any fleet can take to heighten the focus on shop safety.

In 2018, Transervice assumed the responsibility for the truck maintenance and repair operations for Vaqueria Tres Monjitas (VTM), the second largest dairy operation in Puerto Rico. VTM operates 400 pieces of equipment, which are serviced by more than a dozen technicians. The Transervice team was impressed

with the dedication and efforts of the workforce, but noticed areas that needed improvement from a safety standpoint.

VTM operates out of a main location near San Juan, with three remote locations as well. Those are serviced on a rotating basis with a mobile maintenance unit and the required technicians—diesel and refrigerated technicians, depending on the service needs—dispatched from the main location as needed.

Here is a brief look at the steps the Transervice team took to move VTM from a good shop to a great shop, eventually achieving the distinction of having no workplace accidents over a 12-month period.

➤ **Perform a complete site assessment.** The first thing we did was to conduct a walk-through of the shop noting areas that represented the biggest safety hazards. One area of concern was the in-ground pits that served a purpose at one point; however, they were not protected by curbs, chains, or safety markings. Although the team in place had effectively worked around the pits, we saw them as a potential trip and fall hazard that also limited the shops' capabilities. The pits were ultimately eliminated, allowing for better shop utilization and flexibility.

➤ **Improve overall appearance.** With the elimination of the pits, and as part of the shop reorganization, the Transervice team performed a thorough cleaning and painting of the entire shop, adding safety markings to help create safer walkways. Improving the overall appearance of the shop with something as simple as fresh paint can go a long way in helping technicians take pride in their workspace. They will work hard to keep it clean, tidy, and safe. In addition, the team updated and upgraded technician uniforms

with high-visibility stripes on them, as well as custom Transervice high-visibility safety vests for management and administrative personnel who were required to wear the vests whenever they visited the shop. This demonstrated and reinforced management's commitment to safety.

➤ **Reorganize for better workflow.** If a workflow plan does not already exist, create one for the shop that allows technicians to get where they need to be without having to walk around a lot of objects. In order to have easier access to specialized tools and prevent technicians from having to walk through each other's work areas, we relocated the specialized tools that were housed in an outbuilding to the main shop area.

➤ **Eliminate hazards.** Compressors and all the air lines in the shop were replaced/relocated so that ports were brought much closer to where they were needed. The shop was replumbed with a different compressor and airlines were relocated much closer to the bays. Upgraded waist-high stainless steel stands and tables were installed so technicians did not have to bend over to pick heavy objects off the ground, risking an injury.

➤ **Focus on shifting culture.** When it comes to changing culture, it is important to get buy-in from your technicians. The law of thirds tells us that anytime you try to change things, one-third of the people will jump in and get onboard with the change, one-third will say they are never going to change, and the remaining third will do whatever the majority does. When we assumed management of the shop, we hired much of the existing crew, but also added staff. Part of the hiring process was to assess job candidates' commitment to safety. We wanted to hire team members who would commit to waving the safety banner.

➤ **Continually reinforce safety.** We hold safety meetings regularly to continue to promote the importance of safety throughout the shop. At VTM, we gave the technicians very specific examples of things we wanted them to do. As an example, eye protection was not part of the norm. We instituted a mandatory policy for eye protection. In 2020, one of the gifts we gave the technicians was a headband that said, "Safety Vision is 20-20," to remind them of the importance of safety.

The result: The main facility—which services 427 pieces of equipment annually, operating 20 hours a day—was accident-free in 2020.

Transervice continues to emphasize safety in a number of different ways. One way is through its Toolbox Talks, which allow management to communicate with the team about safety-related concerns. It also holds an annual technician appreciation event which includes a new safety message for the year and a gift for each of the technicians which contains the safety message for that year. But perhaps more importantly, the leadership team continues to "walk the talk" by enforcing the wearing of high-visibility safety vests for themselves and all visitors to the shop. ■



By Gino Fontana

CHIEF OPERATING OFFICER, CTP

Gino Fontana, CTP, is Chief Operating Officer and Executive Vice President at Transervice Logistics Inc. Previously, he was Vice President of Operations Berkeley Division & Puerto Rico. His expertise emphasizes cost savings, process efficiency and improvement, superior quality, and people management skills. He has more than 35 years of experience in the transportation and logistics industry with both operational and sales experience.

Purchasing a Diagnostic Tool – What to Know

In an industry with razor-thin margins, vehicle uptime is key to a fleet's profitability. Maximizing uptime begins with dispatching thoroughly examined vehicles and monitoring their health, safety, and performance status while on the road.

Fortunately, today's technology offers in-shop tools with embedded guided diagnostic features that help newer technicians perform like seasoned veterans and remote monitoring tools that provide insights as if a master mechanic were keeping an eye on your trucks 24/7.

Integrations

Determine the other products and services you may integrate with your in-shop diagnostic tool. If your company utilizes remote diagnostics, consider partnering with a company that offers both solutions. For example, Noregon's in-shop diagnostic solution, JPRO Professional, shares fault history data with their remote diagnostic application, TripVision, to help users detect recurring or intermittent issues in person or while monitoring remotely.

If you utilize third-party OE databases for submitting repair order information or managing warranty claims, select a tool that lets you upload this information without the requirement to switch to the OE's component-based software.

Similarly, you may choose to integrate repair information and interactive maintenance guides such as NextStep Repair. Once you determine the integrations or modules you would like to add, ensure the prospective tool is compatible.

All-in-One Solution

Most fleets own a variety of vehicles, and many independent repair facilities work on all popular vehicle manufacturers. Additionally, many dealerships will accept work from other OEs, signifying the importance of utilizing an all makes and models tool for every truck entering the shop.

By standardizing on a tool that can diagnose all trucks that enter your facility, your technicians can become proficient on a single application and utilize it for intake, triage, diagnostics, and troubleshooting. In addition, equipping technicians with the same tool eliminates discrepancies and ensures the issues detected during intake and triage will be the same information the technician sees once the truck is in the bay.

Hardware Considerations

If you already own shop devices such as tablets or laptops, first verify that the software you are evaluating runs optimally on those devices. Next,



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check to make sure operating systems (OS) are up to date and supported, both by the OS manufacturer and the diagnostic tool manufacturer.

For those purchasing a complete diagnostic kit that includes an electronic device, strongly consider a package featuring new hardware rather than used or refurbished. Shop environments are tough on electronics, and because computers quickly become obsolete, purchasing a new option provides the latest technology and the strongest warranties available.

Also, research who will handle warranty repairs if an issue occurs. Often you will have to send the device to the manufacturer, but some diagnostic tool manufacturers – such as Noregon – are authorized service centers for the devices they provide. Partnering with an organization capable of performing warranty work can significantly decrease device downtime when a problem does arise.

Feature Set

Start by making a list of what you wish to accomplish with your diagnostic tool, then research the features that help meet those goals.

- Are you looking to empower your entry-level technicians to take on more work? Focus on user-friendliness and guided diagnostic features.
- Want to perform warranty work? Seek out applications with OE integrations.
- Do you repair the latest makes and models? Ensure you receive multiple coverage and feature updates throughout the year.

The Selection

Think you found the right tool for your organization's needs? Take it for a test drive. Most diagnostic tool manufacturers offer a demo or trial option, plus you can typically request a representative demonstrate the tool's value on a live truck at your facility. Finally, ask other industry members what they use and which other tools they tried. You will find that many others have been through the process and can offer sound advice.





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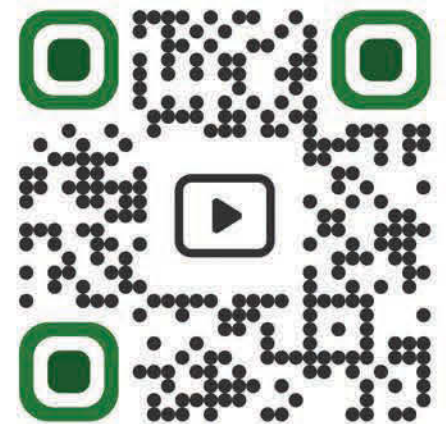
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